

QL

WORLD

THE INDEPENDENT MAGAZINE FOR THE QL OWNER

C O M M
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N O
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A T I



DRIVE COMPETITION
BUSINESS SOFTWARE
PART 2
TYCOON OFFER
PROGRAMS GALORE
PERIPHERAL REVIEWS

COMMODORE 64/SINCLAIR QL

2,000 Screen Arcade Adventure



MICRODEAL

QL

WORLD

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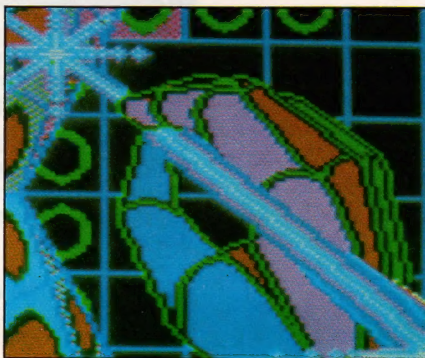
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How you can combine the best of both worlds by using machine code and SuperBasic to speed file transfer. Page 25

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IQLUG has changed its name. Leon Heller explains the reason. Page 37

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September/October 1985

Editor Geof Wheelwright
Art Editor Chris Winch
Production Editor Harold Mayes MBE
Magazine Services Manager Carole Fancourt
Advertisement Manager John Ross
Publisher Paul Streeter
Publishing Director Richard Hease

Contributors

Lynd Morley
Yvette Stachowiak
Jason Ball
Brendan McGrath
Ralph Dawson
Leon Heller
James Morrison
APT Data News Services Ltd
Inkspot Ltd
Chris Winch
Mark Scales

Cover illustration
Illustrations

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SOFTWARE FROM SCOTLAND

GEM on its way for QL?

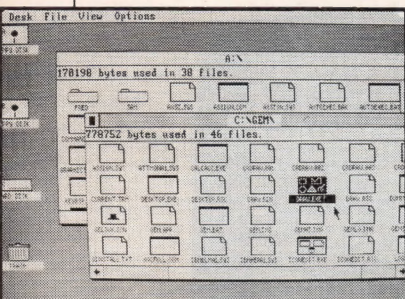
THE DIGITAL Research Macintosh-like Graphic Environment Manager operating environment could soon make an appearance on the QL. DR boss John Rowley says he has had discussions with Sinclair Research about taking GEM to the machine and said that the plan has good prospects and that it would be relatively straightforward to do.

Although no definite dates have been set for a GEM QL release — at press time an agree-

ment had not been concluded with Sinclair Research — the popularity of the WIMP — Windows, Icons, Mouse and Pointer systems — technology as popularised by the Apple Macintosh should encourage both companies to move quickly towards a deal. The need for it was made clearer by recent announcements from Atari and Commodore that they will begin to ship WIMP-style machines.

The Atari offering, the ST range of micros, uses a form of the DR GEM as its operating system and uses the same 68000-family microprocessor as the QL, while the new Commodore Amiga computer has its own Intuition operating system and again uses the 68000.

The announcement of Sinclair-badged 3.5in. disc drives for the QL and the prospect of a GEM implementation just round the corner means that neither Commodore nor Atari will be permitted to be complacent about their new machines.



The GEM Desktop supports overlapped windows which may be placed anywhere on the screen.

Price cut

Sinclair Research announced last month that from September 2, the QL would sell for a recommended retail price of £199.95. The price cut came after weeks of speculation about when and whether Sinclair would cut the price of the machine.

'We have reduced the price of the QL to consumers in line with reduced manufacturing costs,' said Jane Boothroyd, UK sales and marketing manager. 'We will achieve major savings from a substantial increase in manufacturing volume based on sales commitments made to date and more in the pipeline. We have also been able to cut costs through increases in manufacturing efficiency based on experi-

ence gained in making QLs over the last year and a half.'

The price cut came only a few weeks after Sir Clive Sinclair announced that the company's financing and takeover deal with Mr Robert Maxwell had fallen through (see QL World Issue 1).

SINCLAIR RESEARCH has installed Bill Jeffrey, head of its TV and Communications division, as chief executive. The announcement followed weeks of speculation as to who would replace Sir Clive Sinclair.

Jeffrey was known as "the



The QL no longer sits bereft of add-ons.

Interface which offers fresh commands

MORE DETAILS are emerging about the badged add-ons planned by Sinclair Research for the QL. The disc drives, as we indicated in the previous issue, will be manufactured by Micro Peripherals and will offer an updated version of that company's disc interface along with 3.5in. Sony disc drives.

The interface also adds several new commands to the QL Qdos operating system. They include DGET and DPUT, which allow you to read and write sectors from IBM-format discs; SAVEO and SBYTESO, which permit you to save one SuperBasic program over another one. The latter is particularly useful, as it gives you a simple way of

updating BOOT files without first having to delete the old file.

Micro Peripherals also claims to have improved timings on the drives so that it can now save a 32K file in about 20 seconds, making it at least as fast as the other disc interface systems on the market.

There are also apparently plans for Sinclair Research to badge some form of expansion unit for the QL, although the company will not yet give details. At press time, Sinclair Research was in the throes of completing another deal to offer a Sinclair-badged printer. The company has not yet announced prices or availability dates on any of the new equipment.

New chief executive

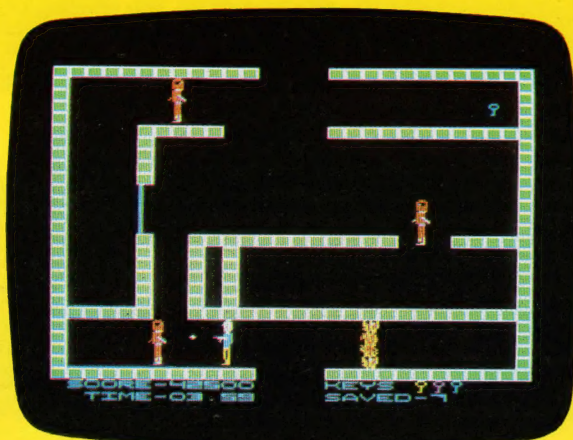
man from Mars" when he joined Sinclair Research earlier this year, a reference to his previous experience as divisional director and head of the Marine Systems division of Mars Electronics.

Sir Clive says he was pleased with the choice of his replace-

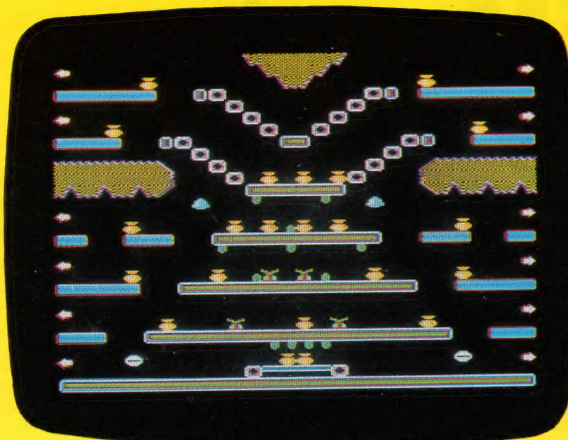
ment and adds, "Bill and I have worked together closely in the last four months and his management and marketing skills have already made an enormous contribution, particularly in realising the potential of the flat-screen pocket TV".

FREE!

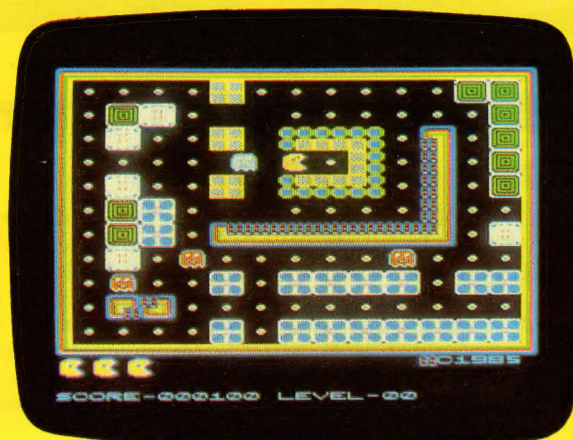
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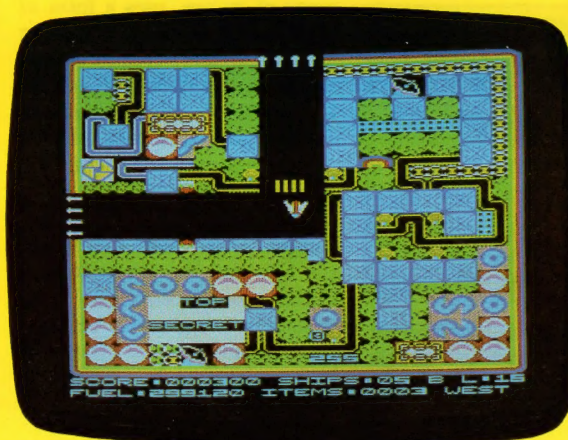
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Legal action plans

THE PREPONDERANCE of similarly-operated QL disc drive interfaces has sparked potential legal action by Cambridge Systems Technology, pioneers in the interface market.

CST says it is taking legal action about unauthorised copying of its Q-Disk disc drive controller for the QL. The company claims that overseas firms are breaching CST copyright by producing "similar-looking but technically inferior" models which are marketed in the U.K. "at knock-down prices."

According to CST marketing director Martin Baines, the action is not aimed at what it regards as reputable competitors

but at what it regards as cheap and fraudulent imitators.

"There are a number of legitimate QL disc drive systems on the market and we welcome competition, but some of the Q-Disk lookalikes are devaluing our product," he says. "Developing the system involved significant research effort. Inexpensive overseas copies are often faulty."

Optical storage

THE LATEST in optical disc storage technology could soon find its way on to the QL. The Sinclair Research Metalab research facility is reported to be looking at ways of hooking the QL to the revolutionary new storage device developed by Phillips and used by Digital

Equipment in its VAX range of computers.

The research is said to be concurrent with the company's investigations of the Drexon Lasecard, a credit-card-sized optical storage system based on strips of plastic with photo-optical recording materials on them.

The Drexon card is reported to store up to 4MB of information on one card and the cards can cost as little to manufacture as £2. Sinclair Research has indicated that it is looking at optical storage technology, although it is talking more about its wafer scale integration system than any other forms of storage.

The reported investigations into optical storage 'credit-cards' follow the exclusive revelation in *QL World* that Electric Software, a division of GST, is investigating the use of 'smart cards' with the QL.

Tandata package approved

THE TANDATA QL-Comms communications package for the QL has been approved by the British Approvals Board for Telecommunications, the British Telecom authority responsible for approving modems.

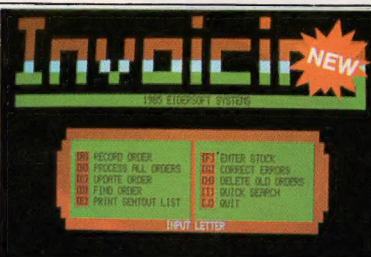
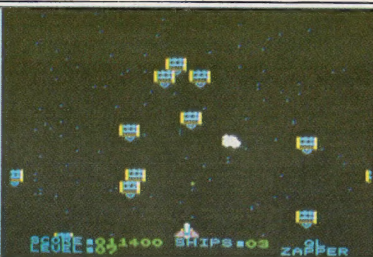
The company claims that orders for the system are being received "at a very healthy rate" and says it is seeking dealers interested in selling the package. It says that about one-third of the people who lost money by ordering a modem from the ill-fated OEL have taken advantage of the Tandata offer of a 20 per cent discount on the QL-Comms package.



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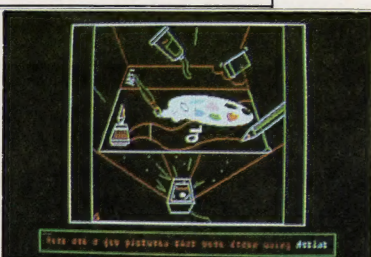
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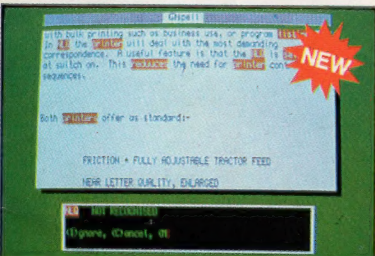
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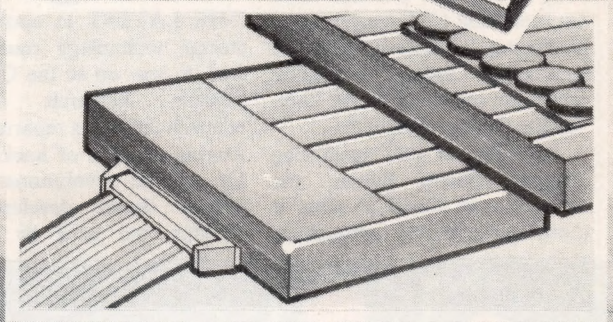
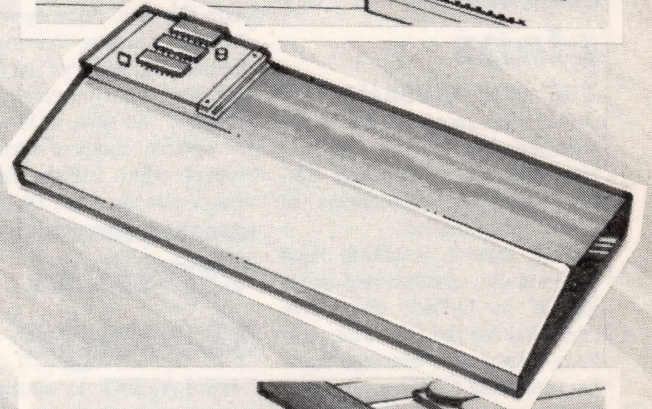
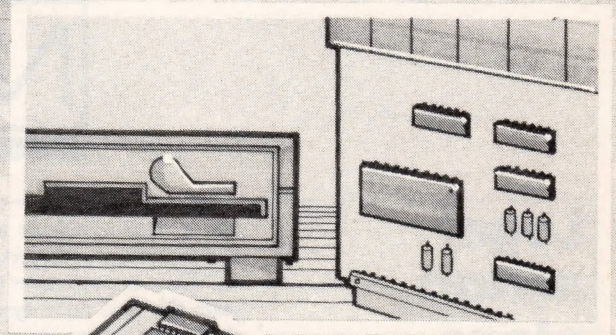
QL Future Growth

New horizons for your microcomputer from CAMBRIDGE SYSTEMS TECHNOLOGY, the dedicated specialists in expansion peripherals for the Sinclair QL.

CST who were the first on the market with a disc drive controller, a Centronics port and a fully operational IEEE-488 interface, now offer the Q+4 multi-way expansion module. With four fully-buffered ports, the Q+4 is fully compatible with QL add-ons and features a controller ROM functioning with any version of the QL operating system. Built into a rugged matching case, the Q+4 is designed to sit beneath the computer.

The CST Q-disc is the first controller to allow standard disc drives to be connected to the Sinclair QL, via the QL expansion port. The Q-disc offers extensive file handling and random access facilities plus an essential utility disc and a comprehensive manual.

The Q-488 is a fully implemented IEEE-488 interface which permits the Sinclair QL to communicate with scientific and industrial equipment offering extensive help facilities plus comprehensive error checking.



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Circle No. 105

30 Regent Street Cambridge
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SOFTWARE ROUNDUP

TO KEEP you up-to-date with the latest and best software releases for the QL, the following list contains most of the major software releases for the QL to date.

IN the Portfolio Software *Stock Market Manager*, the Stock Exchange is put under your control. If the title of the supplier bears any relation to *The Times* Portfolio you have very little chance of success but for £25 there must be more than a little luck involved. Portfolio Software is at PO Box 15, London SW11 5RP.

• There is a new breed of packages from Rodent Software in the form of an *Adventure Writer*

(£19.95), *QL Artist* (£12.95) and several offspring games cartridges (£8.50-£9). Rodent Software is at 3 Brookend Crescent, Henley-in-Arden, West Midlands.

• For those interested in strategy, *Fantasia Adventure* is produced by S B Software and costs £8.50. S B Software is at 20 St Nicholas Street, Diss, Norfolk.

• Snowsoft has really gone adrift with its title *Hungry Harry in the Haunted House*, which leaves little room to say more. For £12 it is available from Snowsoft, 6 Bousfield Crescent, Newton Aycliffe, Durham.

• For those with green fingers and dirty keyboards Superplant Software offers *Plant and Gardening Software* for £11.95. Superplant Software, Llangetho, Tregaron, SY25 6QG.

• Swansoft appropriately has produced *Space Trek*, a search for fulfilment in the lap of the gods. For £7.99 it is an unearthly good price. Swansoft is at 164 Vicarage Road, Morriston, Swansea.

• Talent Software lives up to its title with four excellent packages *ZKUL*, *West* (text adventures for £19.95 each), *Graphic QL* (£34.95) and *Cartridge Doctor* (£21.95). Talent Software is at 101 St James Road, Glasgow G4 0NS.

• Dialog Software has shortened its words to produce *Transact*, a book-keeping system and nominal ledger package suitable for accountants and small businesses at £34.95. It also produces a *Sales Ledger* for the same price and for lesser businessmen there



While it's not among the latest batch of software for the QL, Integrated Accounts, pictured above is becoming one of the most popular business packages.

is *Home Accounts Manager* for £19.95. Dialog Software is at 20 New Row, London WC2N 4LA.

• WD Software of Hilltop, St Marys, Jersey has utilised its position and presumably its method of communication to produce *WD Morse Tutor* for £10.

WDSoftware

FOR THE QL:

WD Utilities (flp2) (£12 on 3.5" disc, £10 on 5.25" disc)
Improved version for the CST/Computamate Q-Disc System. Tested with dual discs and four extra Microdrives, more than 100 files on a disc without overflowing screen and backed-up with single-key commands. Namesake files protected. The EASY way to move your (unprotected) software on and off disc! State 40- or 80-track when ordering.

WD Utilities (3rd ed) (£7.50 on Microdrive)
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RefQL (5th ed) (£7 on mdv or 5.25" disc, £9 on 3.5" disc)
900 useful QL references in ARCHIVE file, with search/print program. Too long to share cartridge with Morse or Utilities but may be added to them on disc for only £5. Cheap to update.

WD Morse Tutor (£6 on mdv or 5.25" disc, £8 on 3.5" disc)
Learn to read Morse Code. From scratch to 18 wpm. Variable speed, pitch & spacing. Random figures, letters, mixed and sentences. Single characters, own message. Feedback on screen or printer. May be added to disc or utilities for only £4 extra.

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Q+2 + 256K Memory.....£199.00+VAT (p&p £5.00)

Q+2 + 512K Memory.....£299.00+VAT (p&p £5.00)

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★ Upgrades completed within 48 hrs.

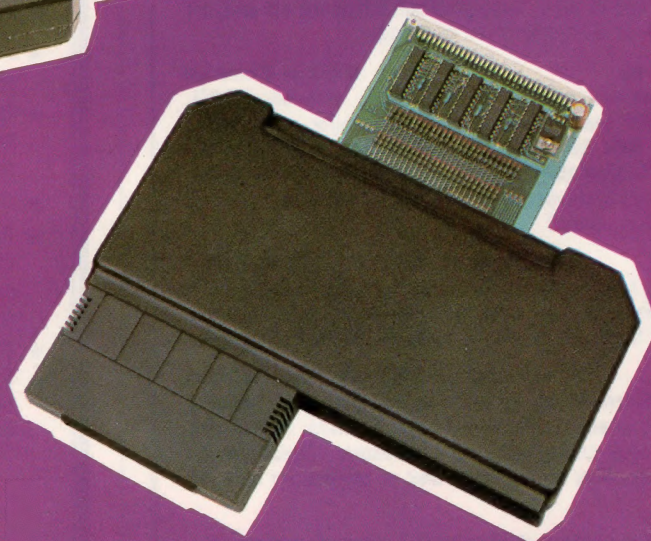
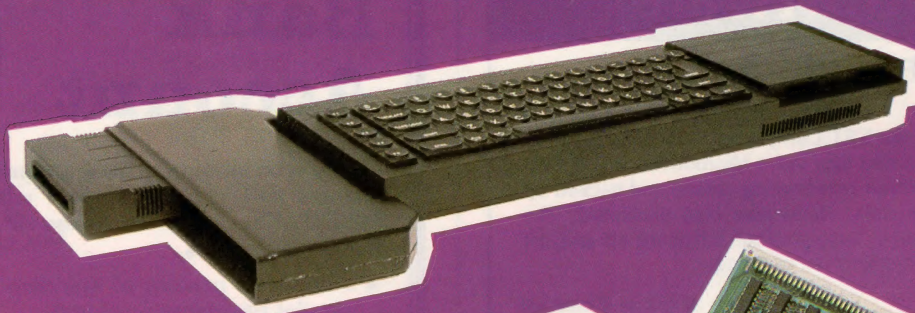
★ One year warranty backdates to a year if board is returned to upgrade.

★ All prices include free RAM disc.

★ Memory expansion speeds up entire QL system by 20–30%.

★ Cuts down Microdrive accesses when using Psion packages.

★ 512K loads HELP file from Microdrives (all held in RAM).



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Choose appropriate mixture

In the final part of this two-part series, *QL World* editor Geof Wheelwright examines some of the recent business software releases for the QL and how those applications accord with the way you already work with your QL. Business software reviews by Jason Ball and Yvette Stachowiak complete the picture.

CHOOSING a collection of business software is something like tuning a television set. Once you have tuned to the station you want, you have to make sure that both your vertical and horizontal hold settings are adjusted correctly.

Horizontal settings, in this case, are the use you might make of horizontal or general-purpose software. Such software cuts across the barriers of profession and includes packages such as Quill, Abacus and Easel. Vertical settings, on the other hand, are the specific uses you will make of the software to do your job. Software in this category would include QL Payroll and Agenda.

So any collection of useful business software would have both vertical and horizontal elements in some mixture appropriate to your needs. Having given you a taste for the horizontal elements of business software in the last issue, in this issue we look at three vertical packages — Agenda, Bank Account and below, Typing Tutor.

UNLIKE journalists, many people go through life without encountering a keyboard, typewriter or otherwise. Although that state of affairs is difficult to recall for old hands, you will probably remember it as a rather perplexing time.

To ease that initial teething — or, in this case, tapping period — the computer world discovered the typing-trainer program. An example of the genre has now been developed for the QL.

Typing Tutor from Computer One Ltd is designed to develop touch-typing skills. The benefit of touch-typing is obvious — the faster you can key-in your information, the faster you can finish your job.

Most typing tutor programs follow roughly the same methods of teaching, producing letters on the screen which must be typed-in as they appear. The programs differ only in

their presentation and some minor aspects of the tutorial.

The Computer One version is in a standard shrink-wrap package with one Micro-drive cartridge and a 14-page manual. The program is copied easily — for back-ups, not for friends — and that is recommended strongly. The program is self-contained, so the manual acts as an overview and provides lesson notes with back-up copy instructions.

When Typing Tutor is booted-up the screen displays a rather poor graphical representation of the QL keyboard and takes you slowly through finding the space, escape and return keys. Typing Tutor then moves on to using the home and outer keys.

Unfortunately, the significance of home keys, the main concept behind touch typing, is not explained clearly in either the program or the manual.

Eleven lessons

In all, 11 lessons are available, accessible at any time by pressing the Escape key. Lessons zero to three are designed to show the basic keyboard concepts behind touch typing and the remaining lessons introduce outer key movements.

In each lesson, a series of letters or very short sentences appear across the screen and your task is to repeat the same keyboard sequence. If you make an error, a buzzer sounds and a mistake message appears at the bottom of the screen, indicating which incorrect key you typed. The incorrect key is

also highlighted on the screen keyboard with a red circle.

The test results are derived from the time taken to complete the exercise, the amount of characters typed and the mistakes made. Your typing speed and accuracy percentage are then presented either to your delight or despair.

One disadvantage is that the program lacks a score-saving facility, which seems a little short-sighted. If you want to keep track of your progress, you have to record it on paper and keep it in a safe place.

Neither is the program designed to teach how to touch-type long pieces of text. Typing Tutor concentrates on repetitive keystrokes — often of the same letter three times — but not on stringing together those keystrokes into extended sentences or paragraphs.

So, even if the basic concepts are covered, you will still have a long way to go before you are able to key-in several pages of text quickly without looking at the keyboard.

For anyone wishing to acquire basic touch-typing skills Typing Tutor is a capable aid to learning but do not expect to be included in next year's *Guinness Book of Records* for the most fleet-fingered typist in the western hemisphere. Only if you practise continually the use of basic skills to build your typing abilities will you be able to become a true touch typist.

The program costs £19.95 and is available from Computer One at Science Park, Milton Road, Cambridge.



QL Bank Account —does it add up?

THE Cenprime Software *QL Bank Account* is a home financial management program designed to organise your financial situation into some semblance of order and it is hot on the heels of a similar program for the QL by another manufacturer — see review of *QL Home Finance* in *QL World*, Issue 1.

QL Bank Account is, in what it promises, very similar to *Home Finance* but the difference is how well it fulfils that promise.

The manual is poorly-presented. Although one can admire the author's eagerness to put the program to market, a short stop at the typesetters would have been a definite asset. As it is, you are left with a dot matrix-printed offering which does not come up to scratch.

The manual is also disorganised. Although the points covered are numbered as 1, 1.1, 2.1 and so on, the pages are numbered consecutively. Unlike other such manuals, which are numbered individually within the chapters, this one confuses two methods of book organisation and succeeds in neither.

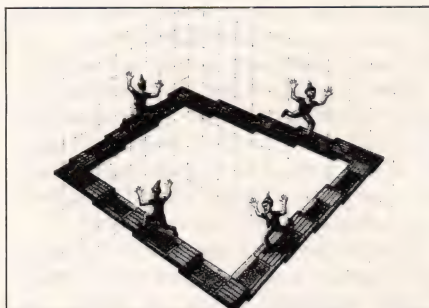
Unless you are familiar with a QL and its idiosyncrasies, prepare to spend some time learning the program through the demonstration mode before you begin to type-in your financial transactions. The program is not very forgiving; therefore it is best to practise on something which will not render your financial picture accidentally into something resembling the U.S. defense budget.

Not complicated

QL Bank Account provides updated balances and allows the facilities for 20 standing orders which are deducted automatically when they are due. It seems unlikely, however, that, as the manual states, the program can "automatically post up to 20 different standing orders, other regular payments". I had visions of my QL trundling to the post box, eagerly attempting to mail all my remittance statements.

Among the other features are the ability to allot codes or group numbers for sorting and editing and the allowance for up to 17 headings. Those headings do not have to be complicated — they can be as simple as Code 1 for income and Code 2 for expenses.

You should be willing to make a date once



a week with your cheque book, bank statements and your QL to make full use of the program. The manual suggests keeping all the printouts and placing them in a key-ring binder for future reference and, no doubt, future corrections.

The program is reasonably easy to enter and displays a main menu with 12 commands, ranging from displaying the *QL Bank Account* to inputting data and standing orders. A status panel on the bottom right of the screen notes the number of entries, capacity, number of standing orders and memory remaining.

Beware of the screen rest facility. If you are studying the main menu, or any other part of the program at your leisure, within "several minutes", as the manual states, about 60 seconds according to my apparently turbo-charged watch, the screen will go blank. Pressing any key will return you to the main menu; it is too bad if you do not want to go there.

Once you are in the data input file the screen will show the present number of the transaction, date, cheque number, description, code payments (debits), receipts (credits) and balance. It displays 21 lines of information, starting at the item number you chose at which to enter the file. The bottom of the screen displays the cursors to scroll, plus three other options, including print. One word of warning; the text on the screen is very dense and if you suffer from myopic vision or have a small monitor screen, you will have to make some adjustments.

To enter new data into *QL Bank Account*, open the input window, which has six fields. The first three include the date, a six-digit cheque number — if you enter a cheque number, the program will treat your information as a debit — and a 25-character description, or details, of the transaction.

The last three fields deal with the code, account and amount for the transaction.

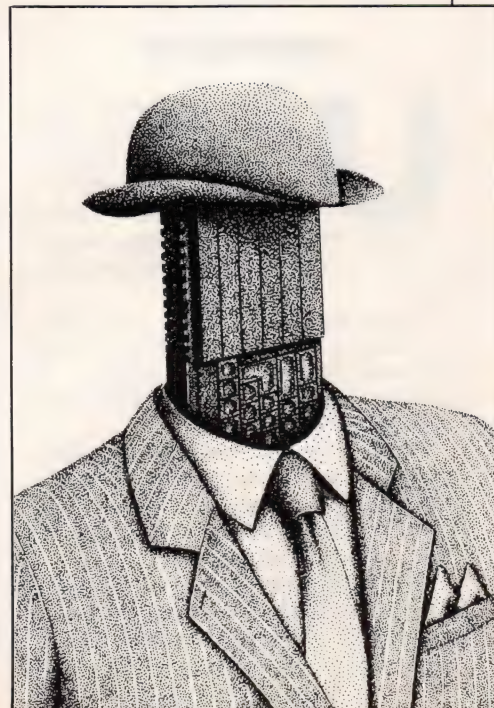
It is important to organise your transactions correctly according to their codes, i.e., all motor expenses could be Code 4, all clothing expenses could be Code 12, and so on, before you begin to input them. Plan a list of codes separately on a piece of paper and stay with it. The success of the program depends on using consistent codes, because uncoded items will not appear on your balance sheet or any headings.

The Amount field has sufficient flexibility to be used for cheques and charge cards. A charge card purchase can be described as such in the Details field and because you would not have entered a cheque number, when you input the amount the program will ask you if it is a credit or a debit. Unless you have an extraordinary arrangement with Access, it is most likely to be entered as a debit in your accounts.

Enthusiastic

One disadvantage of the data input window is that after you have keyed-in all the pertinent information, having those codes correct, the program will ask if the entry is correct. If it is, the window will clear for the next entry. If it is not, the window clears anyway and you have to re-type all that information. The editing facilities are, shall we say, rather enthusiastic.

Standing orders can be treated as credits and debits with the choice of a monthly, quarterly or annual payment scheme. The standing order screen has the headings Number, Date, Frequency, Number, De-



scription, Code and Amount. Confusing as it may appear, the two "numbers" are not misprints; the first number is that of the standing order, the second is the number of payments to be made. The bottom of the standing order screen includes such editing facilities as F3 to add and F4 to delete.

Once you have input all your data, QL Bank Account resembles your bank account; it has all the figures but the analysing is left to you. That is the biggest disadvantage; all it really can do is give you an up-to-date balance of your bank account. More analysis, a better manual and a little polishing would make the somewhat limited program go much further — *Yvette Stachowiak*.

• *QL Bank Account*, Cenprime Software, Dept 1, 10 Castle Street, Rugby, CV21 2TP; £20.

Personal planning program

QL AGENDA is an electronic answer to your pocket diary, except that it does not fit into your pocket. It is a personal planning program for the QL which is both sophisticated and easy to use.

Our review program was provided with both a Microdrive cartridge containing the program and a professional-looking manual. While the documentation has not benefitted from any type-setting, it is clearly presented and serves the purpose adequately.

Agenda can be loaded simply, using a back-up cartridge in Microdrive one and the appropriate data cartridge in Microdrive two. The year, date and present time are typed-in, and relevant data is loaded into memory before the system is ready for use.

The screen is divided into several windows, the biggest of which displays appointments for the selected day. Time and date are shown, updated constantly, and the number of days for which information is entered is also displayed.

Two other windows show a calendar for the month in question and the month following it. Also shown are the commands available for the selected mode.

Initially, three commands are available, accessed by typing the first letter of a command and pressing Return. They permit the formatting of a data cartridge, selection of

various parameters or the straightforward loading of data from Microdrive two.

The parameters can be controlled using the same commands to decide whether you want to view a month or day, load data, or set an appointment.

To set an appointment, you enter the appropriate date, which then produces a new menu and calendar, referring to the chosen months. Any entries are shown and any of the 15 lines may be inserted or deleted.

Appointments are edited and days or months may be viewed easily and printed. If no printer is connected when this option is selected, the program crashes. Appointments may also be incorporated into letters and documents, since *Agenda* files are compatible with the QL Quill word processor.

Few advantages

Despite all those programming pyrotechnics, I still did not see many advantages in using the Q-Soft *Agenda* in place of a normal old-technology paper-based diary.

You can only make an appointment with *Agenda* once the system — i.e., QL, printer, monitor — has been set up, a back-up copy made, the data cartridge formatted and the defaults chosen, the appointment option selected, the date typed-in, the insert command given and the line number typed-in.

You then enter the hour of the appointment and the appointment, before selecting the printer command and waiting for a copy

to appear. It seems a great deal of work to remind yourself of a lunch date.

You are restricted to 28 letters — about five words — for the text of each appointment and you must remember to perform the procedure for saving the appointment afterwards. If you leave your QL switched on all the time and use it for nothing else except running *Agenda*, the QL will remind you of your appointments by sounding an alarm.

First product

If, however, you want to use the QL for a practical application, the diary must be saved and checked for any appointments of which it will fail to remind you. Afterwards, *Agenda* must be re-loaded, re-set and the data transferred into it once more.

Q-Soft is a new company and *Agenda* is its first and at present only product. While it is excellent in its appearance, documentation and performance, Q-Soft has chosen an unfortunate application for an introductory package.

While a few people may find use for the diary, I fear that some commonplace jobs are only complicated by transferring them to computer — and this may be one of them.

I look forward, however, to further developments from Q-Soft, since the company demonstrates a certain professionalism in software design and programming. — *Jason Ball*.

• *Agenda*, £19.95 Q-Soft, PO Box 90, Barnet, Herts EN5 5RU.

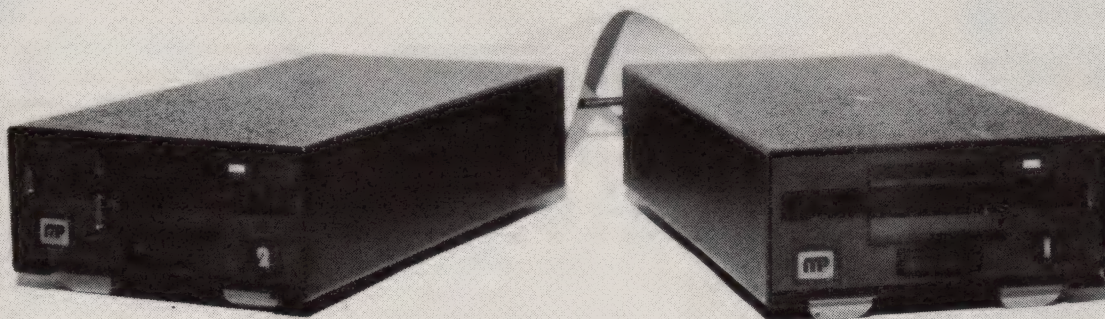


COMPETITION

AS WE REVEALED exclusively in our last issue, Sinclair Research has agreed with Micro Peripherals to offer official 3.5in. QL disc drives and an official disc interface.

To celebrate the event, Micro Peripherals is offering a free dual 3.5in. disc drive and interface to a lucky *QL World* reader. To be eligible for a chance to win the prize, we want you to tell us, in not more than 250 words, the best possible application of which you can think for using a disc system and why you should be given a chance to try it.

Using the form on this page, your entry should include your telephone number, and, on an attached sheet, when you bought your QL, what peripherals you own for the machine and what add-ons you hope to buy in the next 12 months. The best reply will be published in *QL World*, with the name and a photograph of the winner.



ENTRY FORM

Name

Address

.....

.....

.....Post Code

Tel. No.

Entries should be received by *QL World* no later than November 1, 1985, *QL World* cannot take responsibility for lost entries. Please write to: Micro-P Competition, The Editor, *QL World*, Wells House, 80-82 Upper Street, London N1 0NU.

Two modems — same purpose

Communications is the fastest-growing application in the microcomputer industry. Business people throughout the land are crying to get into on-line databases, value-added networks such as Prestel, and electronic mail services. The QL, happily, will not be left out of this stage of the information revolution. So far, two modems which allow the computer-to-computer communications to take place have been released for the QL. In these reviews, Geof Wheelwright and Jason Ball consider the new offerings from Tandata and Modem House.

THE TANDATA communications system has the distinction of being both the oldest and newest QL modem on the market. In its incarnation as the OEL QCOM system, the modem qualifies as the first for the QL but in its more recent Tandata Q-CONNECT form, the modem becomes the latest technology.

Whether it is old or new, the Q-CONNECT system has impressive specifications. It offers three routes into communications — Q-CONNECT, a complete RS-232 output with full two-way buffering and flow control which will operate at speeds between 75 and 9,600 baud. It includes software for Prestel/viewdata/videotex and VT100 emulation and user-to-user communications; Q-MOD, a manual V23 1,200/75 baud and 1,200/1,200 baud half-duplex modem; Q-CALL, an auto-dial/auto-answer module to use with Q-MOD.

We tested all three units running together with the Q-COM software included in the package. The black, modular units stack neatly on top of one another, with two leads emerging to the QL power and serial ports and a socket at the front for the QL power supply.

Good idea

The idea of routing the QL power supply through the modem to avoid the necessity of providing a separate power supply is a good idea but it seems that Tandata missed an opportunity to provide the QL with a much-needed on-off switch. No matter, the modem is the main advantage in this arrangement and it worked admirably.

Using the Q-CONNECT system with its Q-COM software requires you to have the main program in Microdrive One and your

stored telephone numbers in Microdrive Two. When you have those in place, the system will auto-boot from start-up.

The first thing you see is an initialising screen which asks you the time and date — to ensure that the on-screen real-time clock is accurate, and the very presence of such a clock makes time-keeping on expensive databases easy — before prompting you for the name of a book of stored telephone numbers. If you do not have one, the program will select one for you.

You then use the switchboard to use the telephone book and update it. That concept works well and the auto-dialling and auto-answer is executed easily because of it.

The Prestel mode on the QL is very accurate and does not 'squash' the screen too much and gives relatively true colours, unlike some other home computer Prestel modems.

The Modem House Bright Star was the second QL modem to reach the market and, while QL was having trouble, was the only one. Closely resembling the Pace Nightingale, the Bright Star modem uses the same style of extravagantly large case — 7in. wide

by 8in. deep and 3in. high. Unlike the Nightingale, it contains the extra chips necessary for split baud rates.

Notably the Bright Star can also act as a terminal for a Centronics parallel printer. Designed and produced by Commpak Data, the modem is accompanied by comprehensive instructions from Modem House which describe the connection of the modem to the QL, a telephone and a Centronics printer.

The front of the modem shows three coloured light emitting diodes, while the back has a 25-way RS-232C port and a parallel port of the IDC type found on the BBC micro. There is also an on/off switch and a BT plug for the telephone.

The modem communicates with the QL at the default speed of the serial ports, 9,600

continued on next page



continued from previous page

baud, and may be controlled fully using the keyboard, distinguishing it from unintelligent modems on the market.

The default setting for the modem is for the serial printer and no software is necessary for printing, the Qdos Copy command being used to direct data to the printer. That allows graphics routines as well as straightforward text to be dumped to the screen.

The Bright Star is connected via a serial cable using the SER 2 socket on the QL. Connection to SER 1 must be avoided, which can be annoying, since many screen dump programs are configured to use it. The modem is hard-wired to the telephone network — i.e., it is not acoustic — so a standard BT socket is necessary to plug it in.

So simple

Two communications programs are also supplied, one for message services and bulletin boards and the other for information services and databases such as Prestel. They control the modem with the data link escape code CTRL P and the various letters used to select features.

The software could not be simpler to use and with the default settings for the modem incorporated, no selection of baud rates or parity is necessary, a considerable development in user-friendliness.

The terminal program, used to drive the modem when communicating with non-viewdata services, has also been produced by Commpak Data. It was updated frequently before the Bright Star was released but the latest version is efficient and easy to use.

Known as QLTALK, the terminal software is provided on a Microdrive cartridge which is easily booted-up on the machine.

Unfortunately the accompanying instructions confuse the issue by describing the complexities of loading the program; they finish with a note to say that none of the aforementioned was necessary and pressing F1 or F2 after a re-set is the best method.

The screen displays a single-line menu at the top and devotes the remainder to incoming data. There is also a clock/timer at the top right which acts as a reminder of your next telephone bill.

The options are selected using one of the

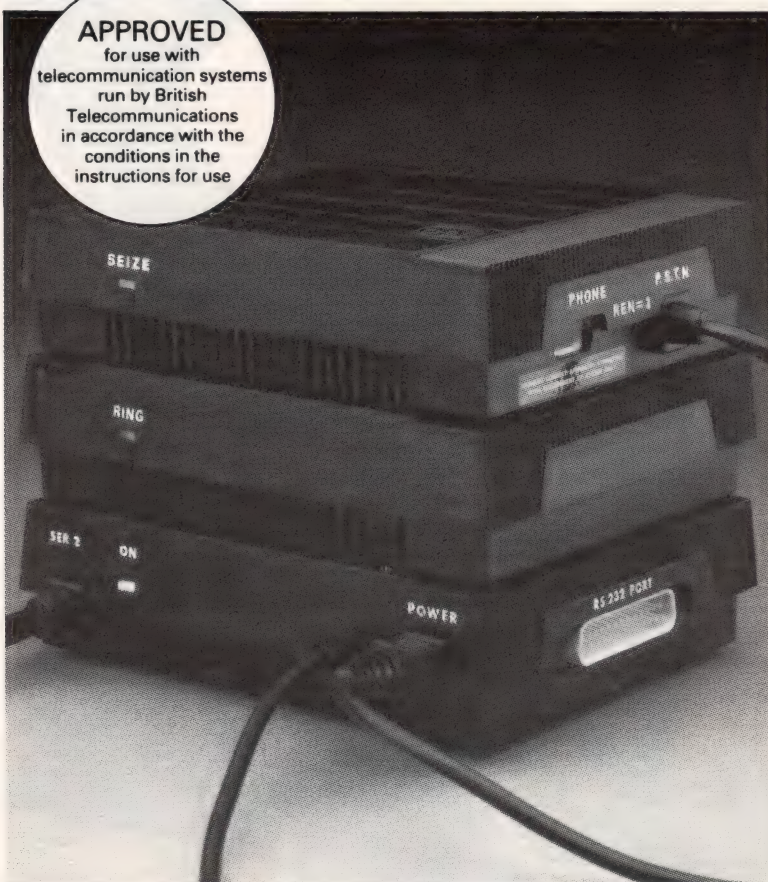


five function keys and they in turn send the appropriate DLE (ctrl P) codes to the modem. The five basic necessities are incorporated — a help menu, the status of the modem, log on, log off and a commands menu to alter ancillary functions.

The commands menu also uses the five function keys, the first selecting 'files', which allows files to be sent or received, by pressing 'S' or 'R' as appropriate. In each case the filename must be given, and the file is abandoned or closed by selecting 'S' or 'R' again.

The second command deals with switching the printer on and off. It refers, however, to a printer connected to SER 1, not to a printer connected to the modem. For data

APPROVED
for use with
telecommunication systems
run by British
Telecommunications
in accordance with the
conditions in the
instructions for use



TANDATA FOR THE

Q-CONNECT

Complete RS232 output for general communications from 75-9,600 baud with full two-way buffering and flow control. Plus all the software on a micro drive to support all 3 modules. The software includes Prestel Viewdata/Videotex AND VT100 emulation, as well as user-to-user communications with error-corrected file transfer (with encryption for security) and many other features including a telesoftware downloader.

Connects to the QL's SER 2 port allowing the micro to be used with virtually any asynchronous modem and for general data communications.

Q-MOD

Manual dial V23 modem operating at 1200/75 baud and 1200/1200 baud half duplex.

Q-CALL

Provides traditional pulse/loop disconnect auto-dial and auto-answer.

Prestel and Telecom Gold are registered trade marks of British Telecommunications plc.

to be printed using a parallel printer, a file must be created and printed with the modem set at default, i.e., off-line.

Third, line feeds and carriage returns are dealt with, offering a selection of alternatives. The screen can also be altered between 80-column and 40-column modes, using the fourth option.

Short cuts

Finally there is an option to exit the program which avoids using a hard re-set. Make sure the modem has released the telephone line first because, if left on, the local exchange will disconnect you temporarily.

Unfortunately the instructions supplied with the modem bore no relation to the latest editions of the software but demonstrated by their complexity that the new software thoroughly simplifies control of the modem.

Modem House offers to assist with any problems encountered, which can save time wasted on trial and error. QLPRESTEL is the software supplied on a separate cartridge

for communication with viewdata services, notably Prestel, which use different commands and protocols. Written in BCPL, the program has had to take a few short cuts to cope with the large memory screen and lack of hardware print control/fonts which make the QL an unsuitable Prestel terminal.

That means that the occasional page will not appear as it should; neither is tele-software covered since it is currently undefined. Once that has been settled, the new version will be available to all registered users.

Exceptional

Configured very differently from QLTALK, the software must be EXEC_W loaded from mode 8 — F2 on start-up. Behaving like a normal Prestel terminal, the QL uses 'Enter' to send a hash code and the five function keys to select various functions.

The modem and software perform well and are put together professionally but the overall success of the system will depend on the quality of the instruction manual, since

the complexities of both the modem and the software can be baffling. The system is exceptional, in that it eliminates so much of the software and manual preparations associated with normal modems and that makes it a joy to use.

It is really a question of horses for courses. The Tandata system is arguably the better-looking of the two units, although the terminal emulation is better on the Modem House unit. Then there is the price. The Modem House modem costs £179.95 at the current special price, but sells normally for £199.95, while Tandata charges £78.22 for the Q-CONNECT base unit, £69.52 for the Q-MOD and an additional £43.43 for the Q-CALL auto-dial/auto-answer unit. The complete price of the Tandata unit is thus £191.72 without VAT.

Tandata can be reached at Tandata Marketing Ltd, Albert Road North, Malvern, Worcs WR14 2TL or by telephone on 06845 68421. Modem House Ltd is at Iolanthe Drive, Exeter, Devon EX4 9EA, or by telephone on 0392 69295.

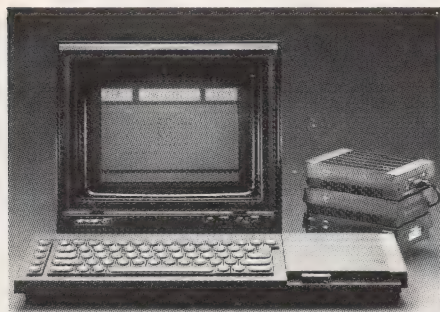
COMMUNICATIONS SINCLAIR QL

Thanks to Tandata you can now convert your QL into a powerful and comprehensive communicating terminal. You can contact distant databases such as British Telecom's Prestel system, private viewdata systems, traditional ASCII databases and electronic messaging/mail services such as Telecom Gold. You can even replace your existing

VT100 terminal and enjoy secure communications with other QLs.

The three smart modules have been designed to match the QL in style and for added convenience they stack together using vertical bus connectors without the need for interconnecting cables.

The modules are available separately, but by using all three as a complete matched



Tandata

Tandata Marketing Limited

Albert Road North, Malvern, Worcs. WR14 2TL.
Telephone: 06845 68421. Telex: 337617 Tandat G.
Prestel *799# Telecom Gold 81: TAN001
A subsidiary of Tandata Holdings plc.

system full advantage can be taken of the integrated features of the Q-CONNECT's software.

If you'd like to know more, simply complete the coupon.

I'd like to know more about
Tandata communications
for the QL.

Name _____

Address _____

Tel No _____

Send to:

Tandata Marketing Ltd.,
Albert Road North, Malvern,
Worcs. WR14 2TL.

First it was aircraft — now its

WITH THE increasing popularity of flight simulation programs, it was inevitable that someone would decide to simulate the action in the control tower. *Area Radar Controller* from Shadowsoft takes up the challenge in a simulation game which puts you in charge of all incoming and outgoing air traffic at two airports.

The game has received critical reviews from many people and it needed great perseverance in the use of the game before I became proficient.

It is not designed for the arcade enthusiast and does not use simple keys and fast reflexes to control an object. Instead, intelligent commands are given to the various aircraft on the screen, which permit you to control their movements.

The program loads a simple title page and proceeds to sound a loud and annoying siren continuously while the rest of the program loads. That was almost sufficient to put me off the game so I suggest you leave the room until the program has loaded.

Once loaded, the titles remain and a compass replaces the aeroplane of the title page. You must choose how many aircraft you wish to control — 10-69 — 10 being almost impossible until the controls are learned.

I would advise a thorough reading of the short instruction manual before you try the game, if only to avoid crashing after the first few seconds, with the resulting insults.

The main screen appears to be unimpressive but that is understandable once the object of the game is understood. You are

of each aircraft — the first is A, the second B, and so on — and pressing the Return key.

If the aircraft is inside your control zone it will respond by giving you its direction, its destination — whether it be a runway or an exit — and its amount of fuel.

I agree with the Shadowsoft assessment of its game — “very addictive — highly frustrating”. The program was very addictive, once the controls had been mastered, and highly frustrating, although the frustration finally got the better of me and for the sake of my health I had to leave the game alone.

If you like a challenge, however, the game is well worth buying. It costs £12.95 and is available from Shadow Games, 70 Gooseacre, Cheddington, Near Leighton Buzzard, Beds. — *Jason Ball*.

Rating				
Playability	★	★	★	★
Graphics	★	★	★	★
Addictiveness	★	★	★	★
Documentation	★	★	★	★
Overall value	★	★	★	★

GraphiQL powerful and complex

SINCE the arrival of the Macintosh MacPaint program, almost every home computer software house has been doing its best to ensure that similar offerings are made available for other machines.

The QL, with its 68000-family processor and high resolution, was an obvious choice for such a program. The result of that choice is *GraphiQL*, a computer art program written and distributed by Talent Software.

GraphiQL is a powerful and complex program, so I took time to look at the system and the documentation supplied before starting to use it and the precaution paid dividends. The system is supplied on two Microdrive cartridges; one holds the main graphics program while the other contains three demonstration programs.

The authors of the package have attempted to minimise the number of available facilities, to keep the use of memory to a minimum. The demonstration pictures are loaded easily, provided the instructions are followed to the letter.

The manual is very plain, resembling an

old school grammar book. Appropriately it fell to pieces by the time I had worked through it, but the impressive contents compensate for that. The explanation of the commands is excellent and it provides a useful reference chapter as well as an index.

The authors suggest that the master program be copied immediately in case of corruption and explain the process in detail. Those with illegal motives for copying will be foiled, as the original must be present for the back-up copy to work, since it provides a secret password.

The QL screen resolution is 256 pixels both up and down, so each picture has 65,536 pixels to play with. Each dot can be pinpointed and has a range of eight colours but since programming each screen pixel would be a mammoth task, various commands allow more practical methods.

Commands can be issued using one, two or three letters in sequence. You must refer to the manual to learn the control codes and commands.

The Crib is an essential help command, showing the position of the pixel at the cursor using x and y co-ordinates, as well as the present colour. If crib mode is on, that information appears on the screen when commands are not being typed-in.

Another good feature is the ability of the system to zoom-in on any area of the screen, magnifying it 16 times and permitting easy alteration of individual pixels.

Drawing aids include the usual commands for lines and rubber banding, where a line is fixed at one end and then extended in any direction by cursor keys until you find and fix the correct position.

Commands are also available for circles, ellipses, erasing lines and flashing colours. Areas may be defined and then copied or filled with colour. Various forms of text can also be used in pictures.

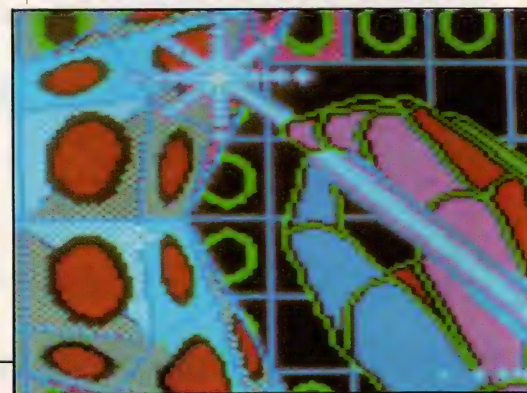
Many more obscure functions are available, including two differently-shaped cursors and eight cursor colours, and the ability to rotate, reflect and move blocks of your picture.

I would recommend use of a joystick with



mainly responsible for moving the aircraft tactically around so they do not collide with one another — or the tower — and not just zapping everything in sight.

You start by looking at a rectangular air traffic zone with nine numbered exits and two runways. The aircraft first appear just outside your traffic control zone and, on entering the zone, you may communicate with them. That is accomplished by pressing a letter representing the call-sign letter



control tower being simulated

the system because the cursor keys are awkward and close to the space bar, which is used to cancel commands.

I would recommend the system to anyone who is interested enough in graphics to pay £34.95 for the package; it is certainly the best available.

Bear in mind, however, that to achieve the same quality as the demonstration pictures will take many hours of painstaking work. Talent has created only one new picture for the demonstration; the rest were developed for Talent adventure programs — *Jason Ball*.

Blackjack creditors always tall

BLACKJACK from Quest is a computer interpretation of the well-known game, also known as Twenty-one, using what are claimed to be English rules. The introductory picture is spectacular, showing a characteristic card table with the familiar cards, chips and a whisky glass.

The original suggests that you can make several back-up copies but since the back-up

Having welcomed me to the Golden Nougat, the voice from above informed me of my financial situation and asked for my bet to be placed. At the bottom of the screen my voice bubbled out "I think I'll bet" and I typed-in a mere 10.

There are four main parts to the rules in this version of the game. Three packs of cards are shuffled but only the first two-thirds of the pack is used.

The appropriate chips were laid before me and my cards were dealt, as were those of the dealer, one visible and the other inverted. Then the bubble from above appeared to have an identity crisis, changing from the correct English accent — it is an English version of Blackjack — to an American "what do you wanna do, fella?"

To take another card you press H for hit — another American phrase — or you may press D to double — take a card and double your bet. Alternatively, if your deal is high you may press S to stick and let the dealer try.

A new rule to me — but familiar to experienced Blackjack players, no doubt — was the option to split if I was dealt two cards of the same value, thus playing each card as a separate hand. Unfortunately there is no scope for five-card tricks but that may be in keeping with the English rules.

Whatever you choose, your bubble will speak your reply and the dealer declares the results as they are shown.

After each hand you may view the score-sheet, leave the table or continue to play, in which case you will again be asked to place your bet. When you leave you may save your score to pick up your winnings when next you play.

Generally the game is really professional, with excellent graphics and a pleasant approach. It slips up on its language, which tends to be far from English and can be insulting — you may not take kindly to being called Mutton-head and You Wally.

I found it slightly predictable after a time and by careful betting I managed to make thousands of pounds but generally it proved to be an addictive and entertaining package, well worth the price.

Blackjack costs £19.95 and is published by Quest. — *Jason Ball*

Rating				
Playability	*	*	*	*
Graphics	*	*	*	*
Addictiveness	*	*	*	*
Documentation	*	*	*	*
Overall value	*	*	*	*

Cross swords with the QL

TYCOON is an original and challenging business game, based on the crossword puzzle and written by a master businessman, Victor Serebriakoff, president of Mensa.

Designed for up to six players, the object is to guess the words in a crossword to sell them to the bank, so making as much money as possible. The financial realities are enhanced by facilities for borrowing money, on which you are charged interest, to buy specific or random letters from the bank, and the chance to invest your hard-earned capital.

Naturally the QL plays banker and keeps the accounts, as well as providing you with up-to-date financial reports to guide your business decisions. The package is well-presented, with the instructions printed conveniently on the box so that you do not lose them.

The program looks much as you would expect a crossword-puzzle-based word game to look. You are presented with an on-screen puzzle-like grid into which you place the letters you buy. That may not look too interesting visually but it is, after all, a game

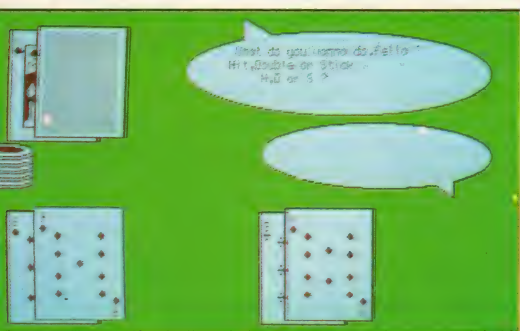
to challenge the brain and not the eyes.

The game is excellent. You may invest a sum, take a loan — and occasionally repay it — sell a word and buy either a specific invisible letter on the crossword or a random letter, so that you can guess the words in the spaces.

If you are really stumped, you can always pass your turn. Once you have decided on the word fitting a particular space, you may sell it to the bank, before someone else does, by typing it in when asked. If the word exists, the bank acknowledges it, fills it in and pays you handsomely.

Be warned. If the word you suggest is slightly incorrect, you lose money. Altogether it is an unusual and excellent game, which was enjoyed thoroughly by those who played it, and it is also unusual in that it puts more than one or two people round the television screen — *Jason Ball*

The QL version of Tycoon is available exclusively through QL World. For details on where and how to buy the game, see the special offer on page 41.



process takes almost 10 minutes, one back-up was sufficient for me. The back-up should be used if you wish to save your winnings.

Having loaded the main program — that happens automatically on the back-up copy — I was confronted with one of my least enjoyable and most frequent activities — a cheque to sign — already made out to the gambling house for a mere £100, debited to my new Floyds account.

A bubble from the top of the screen — creditors are always tall — told me in no uncertain terms to sign the cheque, which I did nervously. So, as the great gamester Clever Trevor, I sat at the table.

Tailor-made add-ons for the QL

THE CANON PJ-1080A is a colour ink-jet printer tailor-made for the QL. For many QL users, however, its big disadvantage will be its price — £499 and considerably more expensive than the QL.

Unfortunately there is no way to circumvent the imbalance. Solid state computers are becoming steadily cheaper but mechanical devices can fall only so far in price before the component short-cuts start compromising output quality; if you want exceptional paper output you have to be prepared to pay for it.

The second problem is the Canon parallel Centronics interface, so in addition to the price of the printer you will have to add the cost of a parallel interface for the QL, unless you already have one.

A utility is available from Micro Peripherals to permit you to output colour screen dumps to the printer from the QL. The utility is bundled with the Micro Peripherals QL disc interface but no doubt arrangements can be made to have the utility on Microdrive cartridge for a few pounds.

Ink-jet technology has two main strengths compared to alternative impact technologies. First, it is very quiet. Second, the quality of the colour output can be even. It is possible to make a pleasing effect with blocks of colour with the ink-jet where when using impact printers the results can look a trifle grimy.

Something for nothing

The system works by squirting drops of ink selectively from a horizontal line of four cartridges — yellow, magenta, cyan and black — thus providing all the primaries. The cartridges work rather like tiny tubes of toothpaste. When a voltage is applied to a selected tube it squeezes itself momentarily and emits a droplet. The Canon produces a line of dots at a time but it does each line quickly. Even so, in print mode you are looking at about 20 characters per second — faster than a slow daisywheel but much slower than a conventional dot matrix printer.

Never, however, can you get something for nothing. In print mode the characters tend to look a little skeletal and speed is not up to the best. It is in graphic or fancy type modes that the printer scores.

Setting-up the printer is a straightforward process. The usual form feed, line feed and on-line buttons are situated on the front panel. The unit is a neutral cream colour and is dot matrix printer size, though perhaps a little thicker than average. A4 paper can be fed in as cut sheet or continuous

stationery and there is a cavity for continuous roll paper which is probably best for graphics work.

The jet system can require manual priming and there is a small pump lever situated inside the perspex hood for the procedure. A BOLD switch at the rear makes the characters a little stronger; the manual indicates that that is particularly useful for overhead transparency films.

The documentation is very good and indicates that printer manuals are at last coming of age. There is a clear, idiot-proof set of setting-up and operating instructions, augmented by a comprehensive section on es-

Colour printers and expansion boxes are probably the kinds of add-ons most QL owners dream about, but don't often see. On this page, Ian Seales reviews a colour printer from Canon and Leon Heller looks at the Simplex expansion unit.

cape codes. The appendices feature a collection of Basic programs to accomplish some business graphs.

Every escape code has a page to itself, together with a demonstration Basic program. They can be converted easily to SuperBasic. As well as all the usual codes to advance the paper and execute horizontal tabs, there is obviously much to learn in the colour control code area. No doubt many users can have fun fiddling with the printer to produce effects. Escape codes will set background colours so that characters can be reversed. Text can also be enlarged and boldened, underlined, and blocks of colour can be produced by setting the colour graphic image mode.

In use, the Canon is pleasingly quiet. The cartridge assembly rushes back and forth but the only noise is from the assembly clicking as it changes direction. It is not the kind of printer with which you might want to write to your bank manager but its print mode produces readable output.

You will probably find that the bold option is mandatory for producing anything likely to be read by anyone else; for many users it can perform as a general-purpose printer for graphics and text. It is in graphics mode that it will earn its keep; there is nothing like the ability to produce hard-copy colour output to spur the enthusiast into producing business graphics. In conjunction with Easel, the Canon should make a colourful if sometimes costly companion to the QL — *Ian Seales.*

MUCH has been made of how expandable and powerful the QL is but the truth of the matter has always been that you could never fit two expansion cards into the machine at once and therefore you could never really get at that much-lauded power.

Simplex Data Ltd, well-known for its 256K and 512K RAM expansion modules for the QL, has tackled the problem with a simple two-slot bus expansion unit, which allows both memory expansion and peripheral devices, such as disc interfaces, to be used at the same time. QUANTA head man Leon Heller wrote this product preview

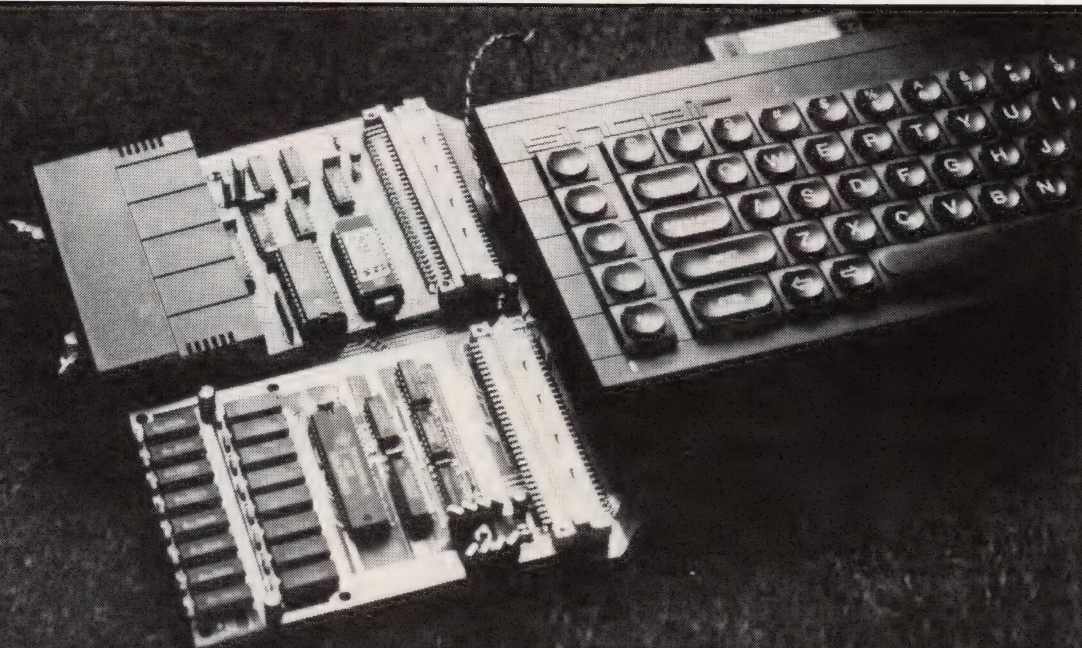
based on a prototype unit of the Q-Plus 2 supplied by Simplex.

The unit consists of a T-shaped PCB, as seen in the photograph, which plugs into the expansion port at the left of the machine. The circuitry is simple, consisting of a handful of buffer chips and series damping resistors, which should prevent such nasties as "reflections" and "ringing" interfering with correct operation.

Buffering, for readers uninitiated in the mysteries of hardware, refers to the process of setting RAM aside to increase the number of add-ons which may be used by the QL. As you might appreciate, a great deal of information has to go back and forth to the expansion port and when two devices are there instead of the usual one, extra RAM is needed to handle extra commands and information.

The QL allows you to connect only one add-on to the expansion port — two LS TTL loads on every output, for those who know about such things — but the Q-Plus 2 expansion unit uses two male DIN 41612 connectors, similar to that in the expansion port, which permit both a memory expansion module and another peripheral device to be connected.

The signals on the two connectors are not identical and the memory module must go on the rear connector for correct operation. Two non-memory peripheral devices, such as a disc interface and a parallel printer port, cannot be used with the Q-Plus 2 — only one and a memory expansion.



Simplex two-slot bus expansion unit.

The unit has its own external power supply, which also provides power to the cards plugged into it, so there is no chance of overloading the QL supply.

At the time of this review a prototype had been functioning with discs and 512K RAM

'Apart from its obvious use in a business environment, the Q-Plus 2 should prove extremely popular with hardware hackers. It opens a new world for users of the QL.'

for three weeks in a business environment, where the combination consistently out-performed an IBM PC when running some disc benchmark programs.

The production version of the unit will be

encased in an any-colour-you-like-so-long-as-it-is-black enclosure. Aluminium will be employed for the early models and the intention is to use a plastic moulding when the tooling has been designed.

In use, although the unit increases the width of the machine by some 160mm., its low profile means that it does not interfere with keyboard operation. I found, however, that I had to move my horizontally-mounted disc drive towards the back of the desk, as otherwise the Q-Plus 2 obstructed access when inserting and removing discs.

Use with RAM modules

I tested the Q-Plus 2 with the Simplex RAM expansion and it should work with other RAM modules, such as those from Quest, PCML and Medic, as well as the various disc interfaces available. It would be advisable to try the combination with your machine while still in the shop. The combined disc and memory units available from say, Medic, might give problems.

You should have no trouble, however, if all the pieces are bought from Simplex or one of its stockists.

Apart from its obvious use in a business environment — probably the biggest market

— or by software developers needing additional RAM as well as discs, the Q-Plus 2 should prove extremely popular with hardware hackers, as the case can be removed and a prototyping board plugged into the unit via a short length of ribbon cable and two 64-way IDC DIN 41612 connectors.

Using wire-wrap or Verowire construction techniques, interesting add-ons such as an EPROM programmer, speech synthesiser, or even another processor, could be developed, with little likelihood of the hacker blowing-up his QL in the process. At worst, a chip or two might have to be replaced on the Q-Plus 2.

Summing up, the Q-Plus 2 opens a new world for the users of the QL, limited previously by the restricted expansion capability of the machine. It will be distributed by Simplex which already handles the 256K and 512K Simplex RAM modules, and will retail for £69.90, which seems good value.

Bigger branches of W H Smith will be stocking it, so prospective users will be able to try it before buying. Thanks to Mary and Cliff Found of Simplex Data Ltd for providing at very short notice the hardware on which this review was based.

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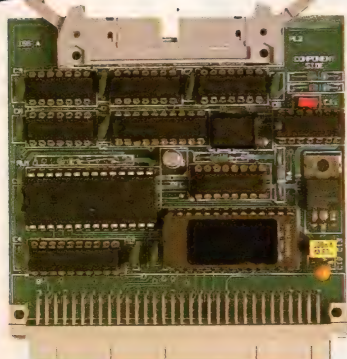
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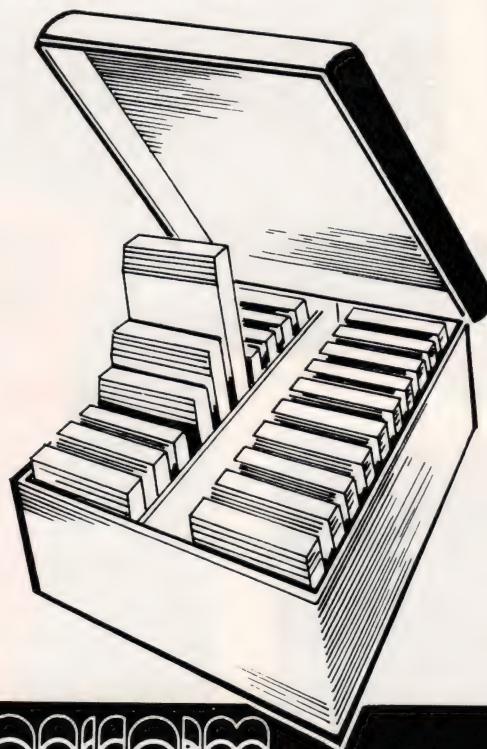
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Transform

Making best of two worlds

MOST comment surrounding the QL has centred on discussion of the built-in Microdrives. Many users believe that because the Psion software can take up to 15 or 20 minutes to back-up from one cartridge to another, all the delay must be attributed to inadequacy in the Microdrives provided with the machine.

The programs presented in this and the next issue of *QL World* combine the best of machine code and SuperBasic to speed file transfers by up to a factor of 10. Copying a full cartridge of software with 35 files on it takes three to four minutes instead of 15 to 25 minutes. The effective transfer rate to and from cartridge approaches that of disc drives.

The programs are device-independent and can be used to transfer from cartridge to disc or vice versa. Rapid disc-to-disc copies are also possible if you have twin disc drives.

Developed originally to ease the problems of running the Independent QL Users' Group software library, the programs have been tested extensively and revised in the last year. Many people have asked for some documentation and a description of how everything works, so here it is.

Half and half

About half the fast copier is written in SuperBasic and half is written in assembler. Despite the fact that the macro facilities of the Metacomco assembler were used to some extent, it will be a reasonably simple task to assemble the source code using other QL assemblers, provided the relevant macro calls are replaced with the appropriate code.

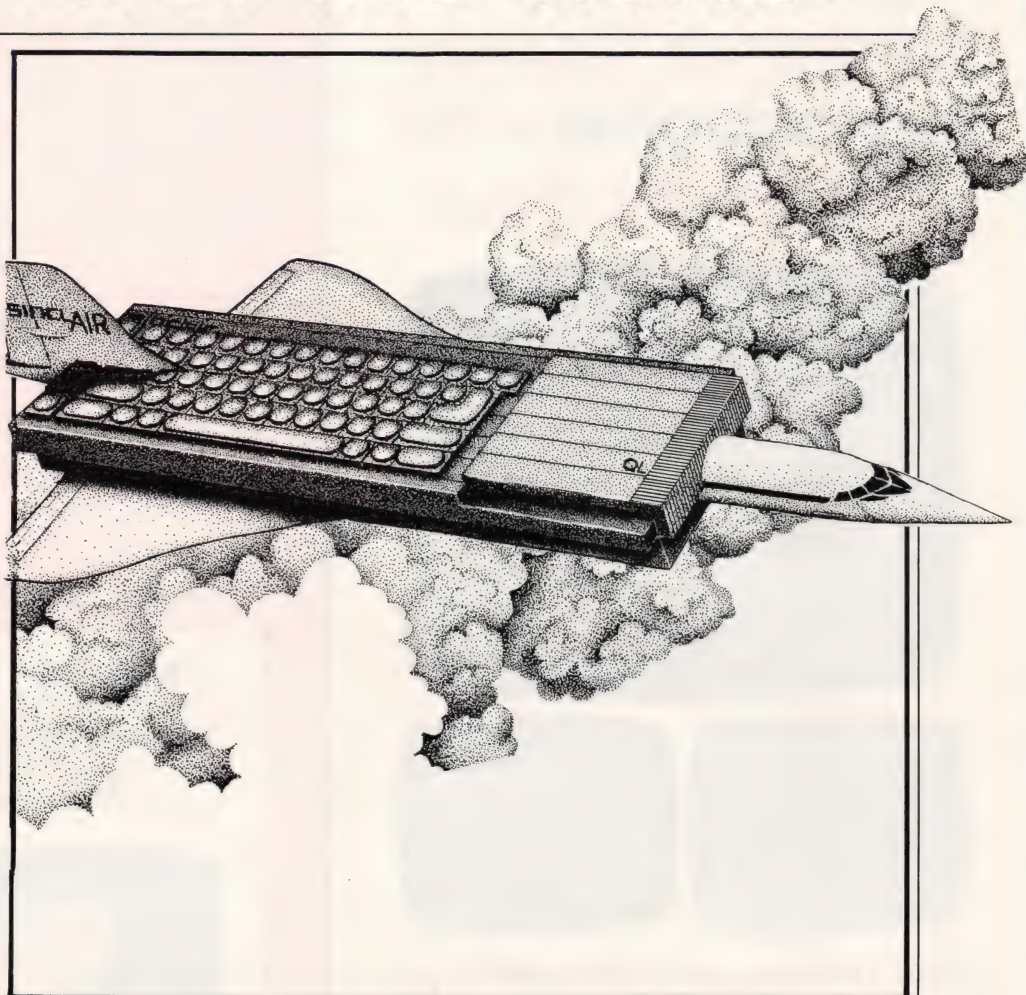
The runnable version of the fast copier comprises three files, the first two of which are published in this issue:

BOOT : Loads machine code and FCOPY_BAS
FCOPY_BAS : The SuperBasic program
SPOOL_CODE : The Machine Code

The machine code adds two new commands to SuperBasic which are needed before FCOPY_BAS will run. The new commands — see lines 1610, 3800 and 3830 — are SPOOL and NUM_JOBS but more about those later.

First, the BOOT program. The procedure "get_extensions" allocates 600 bytes of space for the SPOOL_CODE machine code, loads the code into the memory area allocated for it, and runs the initialisation part of the code by calling its start address. Finally, the Basic program FCOPY_BAS is loaded and run.

FCOPY_BAS is written as a set of pro-



cedures and the only one which is called when you RUN the program is the procedure RESET — see lines 4500 to 4790 — which sets up some tidy screen layouts for use both on TVs and monitors and presents a menu of choices. Each of the options on the menu is the name of a procedure, the simplest of which is RESET, causing the menu screen to be re-drawn.

FORM — see lines 4830 to 4940 — is provided for formatting new cartridges which really need formatting five times in succession to make sure the tape has finished stretching before being used for real data storage. Subsequently, there is an option in the FCOPY procedure to allow old cartridges to be re-formatted once only.

All the work

FCOPY is the procedure which does all the work and calls most of the other procedures. The main body of the procedure — lines 1330 to 1910 — reads the default source and destination drive names — change line 1490 if you want to use discs all the time — and then enters a repeat loop called "copy-cartridges" which will allow

you to duplicate a cartridge as many times as you wish without having to run through the initial question-and-answer session every time.

Obviously, you do not have to type-in the REM statements and text but I believe that every well-written program should be self-documenting as far as possible. Note the use of long and meaningful procedure names to explain what each procedure is doing.

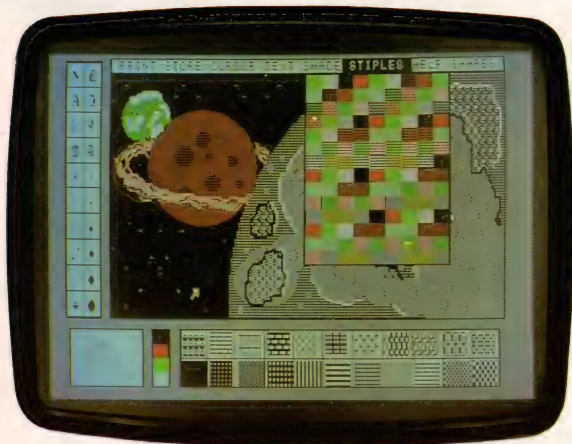
To copy files very rapidly, you must first obtain a file which lists all the other files to be copied — get_directory_on_file. Second, you are prompted, if necessary to specify a subset of the files by answering "y" or "n" to every file to be copied — list_and_read_directory. The clever piece comes next.

Up to 10 source files and 10 destination files are opened before copying starts. For every source file, a machine code process is created via the new SPOOL command. All the machine code processes are co-ordinated by the QL Qdos operating system, so that as much data is read from the source device as is possible before any data is written to the destination device. Little time is wasted idly

continued on page 28

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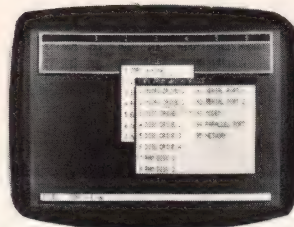
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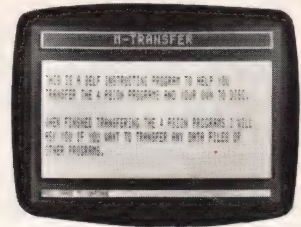
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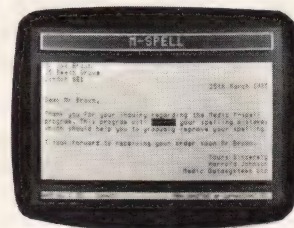
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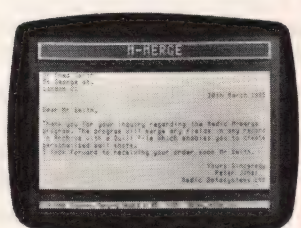
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PROGRAMS

continued from page 25

spinning cartridges. If you are fortunate enough to have an expansion RAM card fitted to your QL, change the parameter at line 1420 so that "max_jobs" is set to, say, 60. Then up to 60 processes or jobs could be running at any time on your QL, each dedicated to transferring one file. That will give an additional improvement in the total copying time.

The final tricky bit is in the use of the new function NUM_JOBS. NUM_JOBS returns a count of the number of machine code jobs running on the QL. The call to NUM_JOBS at line 1610 counts the number of jobs running on the machine prior to FCOPY starting-up the new SPOOL jobs.

The procedure "spool_data_for_all_files" — lines 3670 to 3880 — also calls NUM_JOBS to make sure that the maximum number of SPOOL jobs are always running, as set by the MAX_JOBS variable. If one job finishes, line 3830 will detect that the current number of SPOOL jobs is less than max_jobs and so will exit from the "test_for_done" loop to allow a new SPOOL job to be created.

The PAUSE statement at line 3840 is important because it causes execution of the FCOPY_BAS program to stop temporarily and allows the QL processor to spend all its time looking after running the machine code

jobs which are performing the current file transfers.

Once "spool_data_for_all_files" detects that a SPOOL command has been issued for every file, and hence a corresponding SPOOL machine code job has been or is running, it returns to the main "fcopy" procedure.

At that stage a number of source and destination device channels will still be open and before they can be closed safely a check is made to see if all the machine code SPOOL jobs have stopped running; they disappear when they have finished. That check is made in the "wait_till_done" loop from lines 1780 to 1820. I offer a prize of £5 to the first person who can spot the slight weakness in the technique I have used.

Running library

Finally, all channels are closed — by procedure "close_all_files" — and the option of doing a repeat copy is given by the "announce_completion" procedure, which can also be programmed to bleep earnestly at you when the present copying cycle has finished.

If you want to use FCOPY on discs, the file list feature becomes valuable. The way in which it is used to run the IQLUG software library is:

As programs are submitted or written

they are added to a Microdrive cartridge, until the cartridge has about 25 sectors left free. Often there will be 30 or more programs per cartridge.

The LIST_CREATE procedure is run to create a list of all files on the cartridge. If the cartridge is number 10 in the IQLUG library sequence the list file name might be entered as LIBRARY 10_LST.

All files, including LIBRARY 10_LST, say, are transferred in one go to the current library disc. On average, eight cartridges can be transferred to one 800Kbyte disc.

Assuming that a twin disc drive is being used, FCOPY can then be used to transfer from disc to disc. Unfortunately, there is at present no facility for generating duplicate copies using a single disc drive.

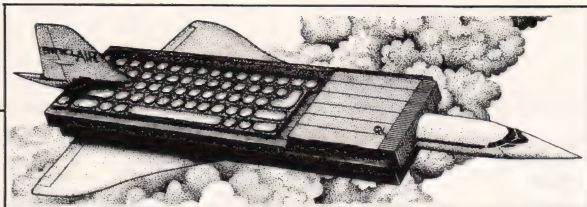
The file list option then becomes extremely useful for copying from disc back to a new Microdrive cartridge. Again, FCOPY can be used and you type "y" to the question "do you want to use a file list", followed by the name of a file list, e.g., LIBRARY 10_LST in the previous example. An exact duplicate of the original cartridge can then be created directly from disc.

● In next issue of *QL World*, we will print the first part of the assembler source code, together with a comprehensive set of notes to reveal more of the mysteries of the QL Qdos operating system — Rob Sherratt.

```
1000 REMark BOOT PROGRAM - FAST COPY VERSION
1010 REMark
1020 REMark This program runs automatically
1030 REMark from mdvl_ after a system reset
1040 REMark
1050 REMark Author : Rob Sherratt
1060 REMark Date : 29th August, 1984
1070 REMark
1080 :
1090 REMark
1100 REMark Load up the "SPOOL" and "NUM_JOBS" machine code
1110 REMark extensions so they can be used from SUPERBASIC.
1120 REMark Afterwards, clear all variables and workspace
1130 REMark
1140 :
1150 get_extensions
1160 LRUN mdvl_fcopy_bas
1170 :
1180 DEFine PROCedure get_extensions
1190 a = RESPR(600)
1200 LBYTES mdvl_spool_code,a
1210 CALL a
1220 END DEFine get_extensions
```

```
1000 REMark
1010 REMark GENERAL PURPOSE FAST FILE SPOOLER
1020 REMark -----
1030 REMark
1040 :
1050 :
1060 REMark Transfers files from a source device (default device
1070 REMark names are stored in the following DATA statements) to
1080 REMark a destination device (eg flp1_, mdvl_, hdk1_ etc).
1090 :
1100 :
1110 REMark This is the ultra-fast version using machine code
1120 REMark extensions SPOOL and NUM_JOBS in order to get very
1130 REMark fast paralleled data transfer. Requires the SPOOL_CODE
1140 REMark file to have been loaded into the resident procedure
1150 REMark area first.
1160 :
1170 :
1180 REMark A filelist can be created on a microdrive by merely
1190 REMark typing "RESET" followed by "LIST_CREATE" with this
1200 REMark program (FCOPY_BAS) in memory.
1210 :
1220 :
1230 REMark Author : Rob Sherratt
1240 REMark Date : 1st May, 1985
1250 REMark Version : 1.1
1260 :
1270 :
1280 reset : REMark That's it - the end of the program !
1290 :
```


PROGRAMS



```

1295 REMark ... but procedure declarations are to come ...
1330 DEFine PROCedure fcopy
1340   Local fname$(60,40), fnum$(60), name$(40)
1350   Local listname$(40), A$(10), S$(10), D$(10)
1360   :
1370   REMark The parameter "max_jobs" is a tuning parameter
1380   REMark which should be increased if you have a memory
1390   REMark expansion board fitted, so that the number of
1400   REMark SPOOLed jobs running in parallel may be increased.
1410   :
1420   max_jobs = 10
1430   filelist$ = "n" : change$ = "y"
1440   :
1450   REMark The default drive names are in the following DATA
1460   REMark statement. Alter them if you have different devices.
1470   :
1480   REMark      SOURCE DRIVE      DESTINATION DRIVE
1490   DATA      "mdv1_",           "mdv2_"
1500   :
1510   RESTORE : READ S$,D$
1520   :
1530   REPEAT copy_cartridges
1540   :
1550   REMark The NUM_JOBS function counts the number of parallel
1560   REMark jobs running before we start. Later on we need to know
1570   REMark how many jobs this program has started up, and we have
1580   REMark to wait until they have all finished before files can
1590   REMark be closed from within SUPERBASIC.
1600   :
1610   initial_jobs = NUM_JOBS
1620   :
1630   IF change$ = "y" THEN
1640     display_initial_text
1650     get_directory_on_file
1660     list_and_read_directory
1670   END IF
1680   :
1690   open_all_source_files
1700   open_all_destination_files
1710   spool_data_for_all_files
1720   :
1730   REMark When waiting for the SPOOL jobs to finish, it is
1740   REMark important not to hog the processor's time in the
1750   REMark "wait_till_done" loop. Hence the PAUSE 100 statement
1760   REMark which waits for 2 seconds.
1770   :
1780   REPEAT wait_till_done
1790     current_jobs = NUM_JOBS
1800     IF current_jobs = initial_jobs THEN EXIT wait_till_done
1810     PAUSE 100
1820   END REPEAT wait_till_done
1830   :
1840   close_all_files
1850   announce_completion
1860   IF again$ == "n" THEN EXIT copy_cartridges
1870 END REPEAT copy_cartridges
1880 :
1890 reset
1900 :

```

```

1910 END DEFine fcopy
1970 DEFine PROCedure display_initial_text
1980 :
1990   INK #2,0: PAPER #2,4: CLS: CLS #2
2000   STRIP #2,2: CSIZE #2,1,1
2010   AT #2,0,20: PRINT #2,"FAST FILE COPIER"
2020   CSIZE #2,0,0
2030   AT #2,17, 1: PRINT #2,"y = yes"
2040   AT #2,17, 9: PRINT #2,"n = no"
2050   AT #2,17,66: PRINT #2,"e = exit"
2060   :
2070   CSIZE 0,0
2080   PAPER 4: INK 0: STRIP 7
2090   :
2100   get_device_names
2110   PRINT "Do you want to copy all files    ? ";
2120   all$ = GET_YN$
2130   IF all$ == "n" THEN
2140     PRINT "Do you want to use a filelist  ? ";
2150     filelist$ = GET_YN$
2160     IF filelist$ == "y" THEN
2170       INPUT "What filelist name ? ";listname$
2180       IF NOT ("_lst" INSTR listname$) THEN
2190         listname$ = listname$ & "_lst"
2200       END IF
2210       PRINT "Copy all files on the list      ? ";
2220       all$ = GET_YN$
2230     END IF
2240   END IF
2250   :
2260   PRINT "Do you want a beep when done    ? ";
2270   noise$ = GET_YN$
2280   PRINT "Do you want to format " & D$ & "    ? ";
2290   format$ = GET_YN$
2300   IF format$ == "y" THEN
2310     INPUT "What name    ? ";name$
2320   END IF
2330   PRINT "\Press any key when you are ready.  \"
2340   PAUSE
2350   :
2360 END DEFine display_initial_text
2370 :
2380 :
2390 :
2400 DEFine PROCedure get_device_names
2410 :
2420   REPEAT get_dev
2430     PRINT "Source drive = ";S$;" .... Alter ? ";
2440     IF GET_YN$ == "y" THEN
2450       INPUT "Source drive ? ";S$
2460     END IF
2470     PRINT "Dest. drive = ";D$;" .... Alter ? ";
2480     IF GET_YN$ == "y" THEN
2490       INPUT "Dest. drive ? ";D$
2500     END IF
2510     IF drive_ok(S$) AND drive_ok(D$) THEN
2515       IF (NOT (S$ == D$)) THEN EXIT get_dev
2530     END IF
2540     PRINT "\"Drive names typed incorrectly. Note "
2545     PRINT "that source and destination device "
2546     PRINT "names must not be identical ...  \"
2550     RESTORE

```

continued on next page

PROGRAMS

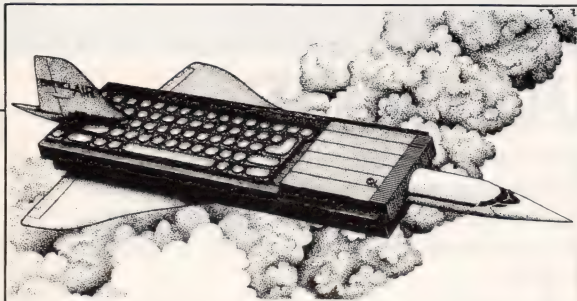
```

2560 READ S$,D$
2580 END REPEAT get_dev
2590 :
2640 DEFINE FUNCTION drive_ok(drive$)
2650 LOCAL ok
2660 ok = 1
2670 IF NOT ("_" INSTR drive$) THEN drive$ = drive$ & "_"
2680 IF LEN(drive$) < 5 THEN ok = 0
2690 RETURN ok
2700 END DEFINE drive_ok
2710 :
2720 :
2730 :
2740 DEFINE PROCEDURE get_directory_on_file
2750 IF format$ == "y" THEN format_destination
2760 DELETE D$ & "dir.lst"
2770 IF filelist$ == "y" THEN
2780 COPY S$ & listname$ TO D$ & "dir.lst"
2790 ELSE
2800 OPEN_NEW #4,D$ & "dir.lst"
2810 DIR #4,S$
2820 CLOSE #4
2830 END IF
2840 END DEFINE get_directory_on_file
2850 :
2860 :
2870 :
2880 DEFINE PROCEDURE list_and_read_directory
2890 INK 0: STRIP 2
2900 PRINT "Directory of ";S$;
2910 IF all$ == "n" THEN
2920 PRINT ". Type ";
2930 STRIP 0: INK 7
2940 PRINT " y ";
2950 STRIP 2: INK 0
2960 PRINT " after "
2970 PRINT "each file if you want it copied. "
2980 END IF
2990 STRIP 7: INK 0
3000 OPEN_IN #4,D$ & "dir.lst"
3010 n=0
3020 :
3030 REPEAT getfile
3040 INPUT #4, fname$(n)
3050 IF n>1 THEN
3060 PRINT n-1;" ";fname$(n);
3070 FOR k = LEN(fname$(n)) TO 26: PRINT " ";
3080 A$ = n - 1
3090 FOR k = LEN(A$) TO 4: PRINT " ";
3100 IF all$ == "n" THEN
3110 PRINT " ";
3120 fname$(n) = GET_YN$
3130 ELSE
3140 fname$(n) = "y": PRINT
3150 END IF
3160 ELSE
3170 PRINT fname$(n)
3180 END IF
3190 IF EOF(#4) THEN EXIT getfile
3200 n=n+1
3210 END REPEAT getfile
3220 :
3230 nfiles = n

3240 CLOSE #4
3250 PRINT
3260 DELETE D$ & "dir.lst"
3270 END DEFINE list_and_read_directory
3310 DEFINE PROCEDURE format_destination
3320 FORMAT D$ & name$
3330 END DEFINE format_destination
3340 :
3350 :
3360 :
3370 DEFINE PROCEDURE open_all_source_files
3380 STRIP 2
3390 PRINT "Opening all source files ... "
3400 source_chan = 10
3410 FOR n = 2 TO nfiles
3420 IF fname$(n) == "y" THEN
3430 OPEN_IN #source_chan,S$ & fname$(n)
3440 source_chan = source_chan + 1
3450 END IF
3460 END FOR n
3470 last_source_chan = source_chan - 1
3480 END DEFINE open_all_source_files
3490 :
3500 :
3510 :
3520 DEFINE PROCEDURE open_all_destination_files
3530 STRIP 2: PRINT "Opening all destination files ... "
3540 dest_chan = last_source_chan + 1
3550 FOR n = 2 TO nfiles
3560 IF fname$(n) == "y" THEN
3570 IF format$ == "n" THEN DELETE D$ & fname$(n)
3580 OPEN_NEW #dest_chan,D$ & fname$(n)
3590 dest_chan = dest_chan + 1
3600 END IF
3610 END FOR n
3620 last_dest_chan = dest_chan - 1
3630 END DEFINE open_all_destination_files
3640 :
3650 :
3660 :
3670 DEFINE PROCEDURE spool_data_for_all_files
3680 STRIP 7
3690 dest_chan = last_source_chan + 1
3700 file_num = 2
3710 :
3720 FOR source_chan = 10 TO last_source_chan
3730 REPEAT get_file_number
3740 IF fname$(file_num) == "y" THEN EXIT get_file_number
3750 IF file_num > nfiles THEN EXIT get_file_number
3760 file_num = file_num + 1
3770 END REPEAT get_file_number
3780 PRINT "Copying ";fname$(file_num)
3790 file_num = file_num + 1
3800 SPOOL #source_chan TO #dest_chan
3810 dest_chan = dest_chan + 1
3820 REPEAT test_for_done
3830 IF NUM_JOBS - initial_jobs < max_jobs THEN EXIT test_for_done
3840 PAUSE 50
3850 END REPEAT test_for_done
3860 END FOR source_chan
3870 :
3880 END DEFINE spool_data_for_all_files

```


PROGRAMS



```

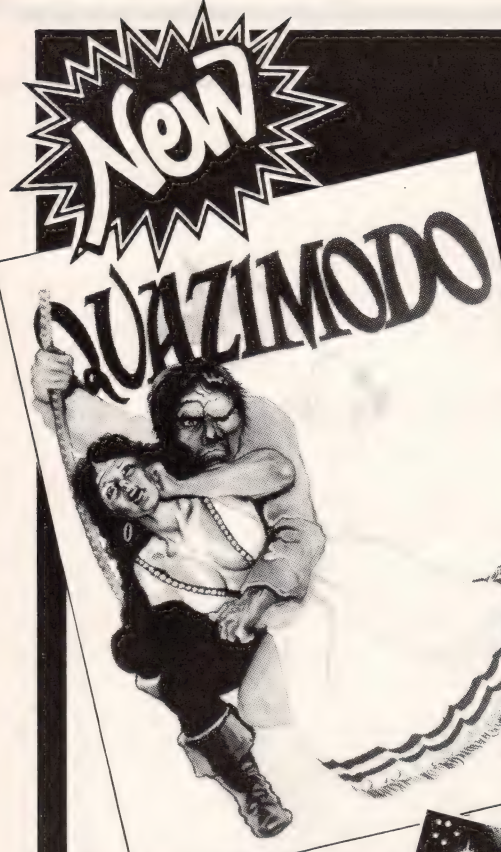
3920 DEFine PROCEDURE close_all_files
3930 STRIP 2: PRINT "Closing all files"
3940 FOR chan = 10 TO last_dest_chan
3950 CLOSE #chan
3960 END FOR chan
3970 END DEFine close_all_files
3980 :
3990 :
4000 :
4010 DEFine FuNction GET_YN$
4020 LOCAL inp$
4030 REPEAT get_inp
4040 REMark Flush keyboard buffer before using INKEY$
4050 inp$ = KEYROW(0)
4060 inp$ = INKEY$(-1)
4070 IF inp$ == "y" THEN EXIT get_inp
4080 IF inp$ == "n" THEN EXIT get_inp
4090 IF inp$ == "e" THEN
4100 reset
4110 CLEAR
4120 STOP
4130 END IF
4140 BEEP 2000,5
4150 END REPEAT get_inp
4160 PRINT inp$
4170 RETURN inp$
4180 END DEFine GET_YN$
4190 :
4200 :
4210 :
4220 DEFine PROCEDURE announce_completion
4230 STRIP 7: INK 0: CSIZE 2,1
4240 PRINT "FINISHED ";
4250 CSIZE 0,0 : PRINT \\
4260 IF noise$ == "y" THEN
4270 BEEP 0,1,50,100,1,15
4280 PAUSE 100
4290 END IF
4300 BEEP 5000,255
4310 PRINT "Do you want to do another copy ? ";
4320 again$ = GET_YN$
4330 :
4340 IF again$ == "y" THEN
4350 PRINT "Is it a different set of files ? ";
4360 change$ = GET_YN$
4370 IF change$ == "y" THEN ELSE
4380 change$ = "n"
4390 PRINT "Do you want to format " & D$ & " ? ";
4400 format$ = GET_YN$
4410 PRINT "Press any key when you are ready ";PAUSE
4420 IF format$(1) == "y" THEN format_destination
4430 END IF
4440 END IF
4450 :
4460 END DEFine announce_completion

```

```

4500 DEFine PROCEDURE reset
4510 MODE 512
4520 :
4530 WINDOW #0,512,256,0,0
4540 PAPER #0,0: INK #0,7
4550 CLS #0
4560 WINDOW #0,454,46,30,206
4570 BORDER #0,1,2: CSIZE #0,0,0
4580 CLS #0
4590 :
4600 WINDOW #2,454,192,30,10
4610 PAPER #2,4: INK #2,0: CSIZE #2,1,1
4620 CLS #2: PAPER #2,2
4630 :
4640 WINDOW #1,218,144,148,40
4650 PAPER #1,2: INK #1,7
4660 CSIZE #1,0,0
4670 :
4680 AT #2,0,20
4690 PRINT #2,"FAST FILE COPIER"\\
4700 AT #2,2,8
4710 PRINT #2,"Type FCOPY to start copying files"
4720 AT #2,4,8
4730 PRINT #2,"Type LIST_CREATE to create a file list "
4740 AT #2,6,8
4750 PRINT #2,"Type RESET to redraw this screen "
4760 AT #2,8,8
4770 PRINT #2,"Type FORM to format 5 times ";
4780 CSIZE #2,0,0: PAPER #2,0: INK #2,7: PRINT #2,\\
4790 END DEFine reset
4800 :
4810 :
4820 :
4830 DEFine PROCEDURE form
4840 LOCAL D$(10),name$(20)
4850 REPEAT get_drive
4860 INPUT #0,"Which device is to be formatted ? ";D$
4870 IF drive_ok(D$) THEN EXIT get_drive
4880 PRINT #0,"Device name typed incorrectly ..."
4890 END REPEAT get_drive
4900 INPUT #0,"What format name ? ";name$
4910 FOR n=1 TO 5
4920 FORMAT #0,D$ & name$
4930 END FOR n
4940 END DEFine form
4950 :
4960 :
4970 :
4980 DEFine PROCEDURE list_create
4990 LOCAL D$(10),name$(20)
5000 REPEAT get_device
5010 INPUT #0,"On which device is the list to be created ? ";D$
5020 IF drive_ok(D$) THEN EXIT get_device
5030 PRINT #0,"Device name typed incorrectly ..."
5040 END REPEAT get_device
5050 INPUT #0,"What name do you want for the filelist ? ";name$
5060 IF NOT ("_lst" INSTR name$) THEN name$ = name$ & "_lst"
5070 DELETE D$ & name$
5080 OPEN NEW #4, D$ & name$
5090 DIR #4, D$
5100 CLOSE #4
5110 END DEFine list_create

```

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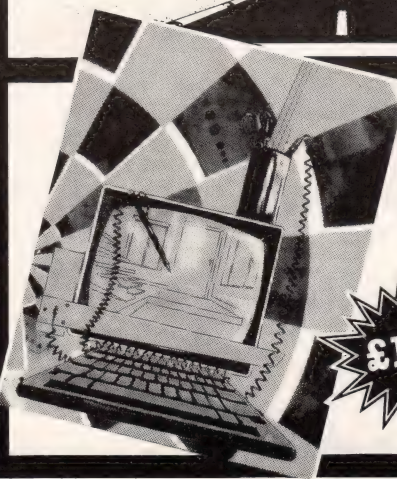
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Drawing blocks on-screen

Our guide to producing leisure software continues with the second part of James Morrison's sliding block puzzle game and Pat Crabb's promised Animals game written in the Archive programming language. We start with the SuperBasic sliding block puzzle, in which you are given the mechanics of how to draw the blocks on-screen.

IN the last issue we gave you the rudiments of a sliding block puzzle and got as far as designing the high score routines. We also examined briefly how you might draw the blocks of the puzzle.

This month we will examine the block drawing a little more closely. A sliding block puzzle needs 16 squares, so the first thing you need to do is to divide the screen into 16 squares and work out the dimensions. Each square will be the same size, so once the size of the window in which the blocks will go has been decided, only a little mathematics is required to determine the size and starting positions of each square. As there are twice as many pixels across the screen than there are down, at least in mode 4, it seems more sensible to use mode 8. That also has the advantage of providing more colour combinations.

If each square is 50 by 50 pixels, the final dimension is 200 by 200 pixels. Two pixels correspond, however, to one in the X direction, if mode 8 is being used, so the window dimensions will be 400 by 200.

Far easier

We suggested that it seemed that the best way of drawing the squares was to treat the screen area as one window and use the BLOCK procedure to draw each square. That means, however, that it will be fairly difficult to move each square from place to place. An alternative is to open a new window for each square. That method certainly has the advantage of being far easier to manipulate but each open channel consumes a fairly large piece of memory. With 128K in the QL, that probably is not too important.

The decision depends on whether it is likely that more than one program will be running alongside the sliding block puzzle, using the multi-tasking capabilities of Qdos. That seems extremely unlikely, so we will make the decision now to opt for the one channel per square method. The windows are set up with the OPENWINS procedure; 10000 DEFine PROCEDURE OPENWINS
10010 LOCAL xlen,ylen,curx,cury,chan,x,y,dev\$
10020 xlen=100:ylen=50
10030 cury=0:chan=3
10040 FOR x=1 TO 4
10050 curx=56
10060 FOR y=1 TO 4
10070 dev\$=xlen & 'x' & ylen & 'a' & curx & 'x'
& cury

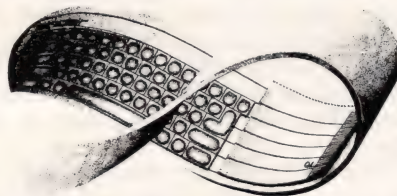
```
10080 OPEN #chan, 'scr.' & dev$
10090 BORDER #chan,1,7:CSIZE #chan,3,1
10100 curx=curx+100:chan=chan+1
10110 END FOR y
10120 cury=cury+50
10130 END FOR x
10140 END DEFine
10150 :
10160 REMark _____
10170 :
```

This procedure opens 16 windows on the screen, each being 100 by 50 pixels. It also sets each one to have a white border of one pixel and the character size to be the biggest possible — 3,1. Notice how it uses string concatenation with the '&' operator to build up the device name to

scr_100x50axxxxyyy

where 'xxx' is the current X position, determined by the value of curx, and 'yyy' is the current Y position, determined by the value of cury.

Although the four parameters xlen, ylen, curx and cury are all numeric parameters, the '&' operator causes each to be 'coerced' into a string so that the end product of the whole operation is a string. Strings and device names are very nearly equivalent in



SuperBasic, so passing a string expression to the OPEN procedure has the same effect as passing it a real device name.

Once the 16 windows are open, each needs to have the paper and ink colours set up to suitable values. As every square except one will have a letter in at any time, it seems to make 15 of the squares one colour and the other one another. The square which does not contain a letter would look best in black, so a complementary colour for the others would be yellow or green. Green will be used here but obviously it is easy enough to alter that at any time.

How does the program choose which squares to colour and which one to set to black? If an array of 16 elements is set up prior to colouring the windows, the job is reasonably easy. This array will hold the 15 letters of the square plus an arbitrary character which the program interprets as 'no letter'. If each letter is shown as a capital,

almost any non-capital character will do for the null character. This program uses the backslash character, '\'.

The last thing which needs to be done before the set-up procedure is to decide on the arrangement of the squares so that the program knows which array element refers to which square. A sensible arrangement is to call the top left-hand square 'square 1', and then traverse the grid towards the right and down. The arrangement is thus:

1	2	3	4
5	6	7	8
9	10	11	12
13	16	15	16

Now the procedure can be written:

```
10180 DEFine PROCEDURE SETSQUARES
10190 LOCAL i
10200 FOR i=1 TO 16:letters
10210 $(i)=CHR$(RND(65 TO 90))
10210 letters$(RND(1 TO 16))='\
10220 NEWSET
10230 END DEFine
10240 :
10250 REMark-----
10260 :
10270 DEFine PROCEDURE NEWSET
10280 LOCAL i
10290 FOR i=1 TO 16
10300 IF letters$(i)<>'\'
10310 PAPER # (2+i),4:INK
10310 # (2+i),0:CLS # (2+i)
10320 CSIZE # (2+i),3,1
10330 CURSOR # (2+i),40,15
10340 PRINT # (2+i),letters$(i);
10350 ELSE
10360 PAPER # (2+i),0:
10360 INK # (2+i),7:CLS # (2+i)
10370 END IF
10380 END FOR i
10390 END DEFine
10400 :
10410 REMark_____
10420 :
```

This routine uses a FOR.. NEXT loop to set up the windows. It first chooses a random capital letter and puts it into the current element of the letters\$ array. The two numbers used in the call to the RND function, 65 and 90, represent 'A' and 'Z' respectively. The next line chooses a random member of the array and replaces its letter with the '\' backslash character, so that it becomes the null element. Finally, the procedure calls the NEWSET procedure which sets up the colours of each square by examining the characters of the letters\$ array.

Once NEWSET has set up the colour of each window, it positions the cursor as near

continued on next page

continued from previous page

to the middle of each square as it can and then prints the character corresponding to that square in the biggest character size.

The letter\$ array, as it is 'global' to the whole program, must be declared with a DIM statement before the main program starts. A good place for that would be line 100, where the arrays for the high score table routines were declared. Alter line 100 so it now looks like

```
100 DIM highs(10,highs$(10,16)),letters$(16)
```

The game is now proceeding well and all that is left to do is to write the parts which constitute the game. The next most logical thing to do is to write the routine which collects a key-press from the user and transforms it into a movement of one of the squares. Each key-press must add one to an accumulator, so that some kind of score is built.

The player who manages to make a sensible word out of the square in the least number of moves must get a higher score than the player who takes more moves, so the accumulator will also need to be transformed into a score. That can be done later.

Movement keys

The procedure to move a square will be called GETMOVE. Let us consider how it could be written. Because the playing area consists of squares, there can be at most only four possible moves at a time. If the blank square is surrounded by non-blank squares, one of those non-blank squares may be moved into the blank square position and the new blank square will go where the non-square was previously.

It seems a good idea to use the four cursor keys as the player's movement keys. If you press the down arrow key, it means you want to move the square immediately above the blank square into the blank square position; if you press the left arrow you want to move the square which is to the left of the blank square; and so on.

Once a move has been accepted, the respective elements of the array must be swapped, the squares must be re-drawn, and the score accumulator must be incremented. Luckily, the sliding block puzzle, being such a simple game, does not need any really complicated algorithms to determine the best possible moves and, of course, the player is playing himself rather than the computer. That has the side effect of making the player his own arbitrator. The program therefore needs a way to indicate to the computer that the game has been won. A key-press which is different from the movement keys is a good idea, so we will use the ESC key to indicate 'game over' to the computer.

THIS VERSION of the Animal game was conceived about two years ago when Ashton-Tate, best-known for its software package dBase II, offered money, with a capitalist 'M', for novel programming ideas using the dBase language.

The language is akin to the QL Archive language in principle, in that it is basically an interpreter, but you may define your own command files. They will execute a sequence of dBase instructions and may call up other command files constructed similarly.

Although Animal reached the finals, it is inadvisable for a 'game' to win against a serious application, since dBase is a serious package. That is not to say the Archive is not a serious package, whatever the experts might say. Anyway, the game did not win the top prize, so it was not marketed and it remained on my shelf until the latest version of Archive arrived.

I decided to write a pre-processor for Archive which would accept dBase II commands and generate suitable procedures for Archive to execute. It soon became apparent that would restrict the QL needlessly so I decided to convert and improve the Animal game instead.

The game works by asking questions, held in the database and, following a path through the database determined by the responses you give, at each stage there is either another question or the answer. In dBase II the index determines the path to follow, while the Archive version SELECTs those animals which fit the responses at each stage. When only one is left, it must be the answer.

The answer the computer gives may not be the animal of which you are thinking. If that is so, you have won and you must tell the computer what it was. It will then elicit a question from you and a response for your animal.

Will not forget

Being a marginally intelligent machine, it does not need telling more than once, and two new branches will have grown on its tree of knowledge which, unless you end the program abnormally, it will never forget.

You should back-up your datafile from time to time, since you are bound to make mistakes and may need to return to a clean copy of the file, and it can be a trifle annoying to have to re-start from scratch. If all else fails, press RESET and pray.

The flexible structure on which the Archive data files are based proved to be far superior to the true random access files operating under dBase and, I would guess, every other database management system.

The two fields held in an Animal datafile are a key and a comment. As more and more animals are added to the database, not only does the physical size of the file increase but the key length increases also.

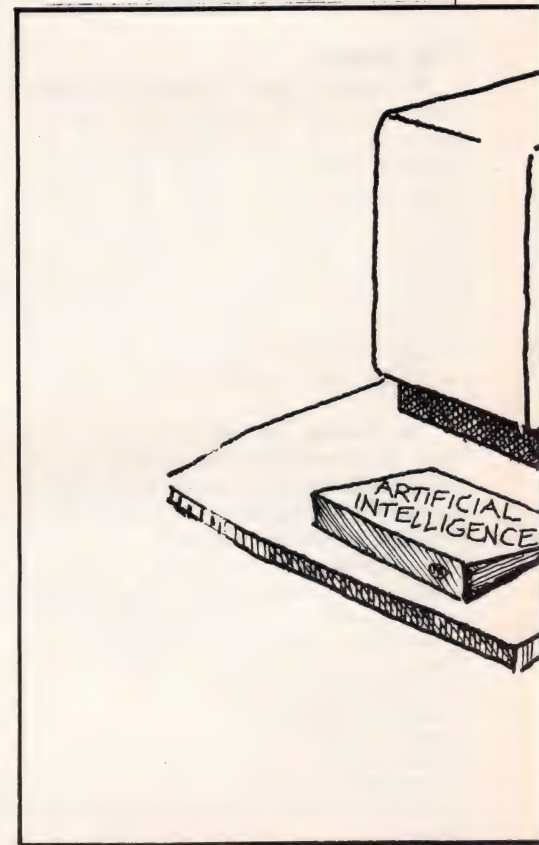
In most database systems, you must specify the maximum key length to be used and that number of characters will be held in the index for each entry. While 20 questions may encompass more than one million animals, it is likely that one branch will be followed doggedly, so to speak, leading to field overflow and loss of data integrity.

Putting the maximum length of the field up to, say, 40 characters would double the size of the index and also increase the size of the database considerably.

The comment field, in respectable databases at least, must also be set long enough to accommodate the most detailed and convoluted of questions, again leading to storage problems.

A realistic dBase II version would use a 15-character key, a 45-character comment, and require a 17-byte index. A few quick sums lead to an upper limit of 600 animals on each 100K disc or Microdrive. To top it all, about 75 percent of that would comprise stored spaces.

What a pleasure it is, then, to play Animal with Archive, which is designed for low-



capacity serial storage, namely the Micro-drive.

Instead of setting aside fixed-length random access buffers, it adjusts the record to the amount of data to be stored. Instead of storing strings of blanks and spaces at the end of a short comment, it cuts each neatly to size. Instead of storing its indices on the cartridge, it holds them in memory and only if you decide you need them in any case.

Simple rules

On a 100K cartridge, I would estimate there would be room for up to 2,000 animals, if you were not too verbose and, in any case, most of you would be hard-pressed once you passed 200 or so. . .

Rule one is very simple — follow the instructions. Rule two is even simpler — be honest.

Enter the program roughly as it is printed. It is designed so that each procedure will fit on a single screen, with the prompts, so the novice is not left helpless or out of touch with the program.

You may naturally lose any REM statements but it is inadvisable to alter anything else which is not obviously cosmetic. You are not writing in Basic now and the LET command is not optional.

By way of style, I prefer to use single

statements on each line and I have combined related operations only where necessary to keep it all on one page.

As you enter each procedure, ESCAPE and save to a suitable temporary file — Archive will over-write a file of the same name, unlike Basic — and when it is all complete, save it to the file "ANIMAL_PRG". You will then need to establish the initial database, which is ANIMAL.D and this uses the CREATE command.

As this is not a tutorial, you should refer to your manual and create a file containing the fields KEY\$ and QUESTION\$. You must then prime it by INSERTing the following data:

KEY\$ QUESTION\$

a Think of an animal and I will guess it
b Has it got four legs?
n a goldfish
y a dog

Check the database carefully, especially check that COUNT() is 4, since it is very easy to add a null record with *insert*. When all is correct, you may CLOSE the file and issue the command START. If you have got rid of the command file, you will need to RUN "ANIMAL".

After two nights of debugging, which will be helped by substituting TRACE for MODE 0 in the START procedure, you

should have managed to run through the complete program without a hitch and you may have added a few animals of your own.

Those who are not confident enough to attack Archive from a programming standpoint might like to know that there is a much more sophisticated version of this game available from Data Management of York. Apart from advanced facilities, it incorporates several databases you can use at once.

A listing of Animal appears on the next page.

For astute observers who have noticed that there is a dearth of REM statements in the program, here are a few notes.

START is executed automatically when RUN "ANIMAL" is typed-in. It displays the sign-on message, opens the file and calls the main routine, returning only to tidy at the end of the game.

QUESTIONS and ANSWERS

ANIMAL controls the game by re-setting the data file, whose first entry is the lead-in prompt and whose second is the opening question. The routines QUESTION and ANSWER are called and, depending on THINKING\$, the process is repeated until an answer is reached. At that stage GOTIT\$ determines whether to rejoice or to ask for enlightenment.

QUESTIONS asks the next question on file or offers an answer if there is only one option remaining.

ANSWER accepts a Y(es)/N(o) response and moves on GUESS, which prepares the next set of possible questions and answers. TOLDYA called from ANIMAL, if the computer guessed correctly, is self-explanatory but TELLUS is complicated.

TELLUS picks up the new question, answer and response, calling on APARSE and QPARSE to ensure that they follow some consistent format. They are not exhaustive parsing routines but sufficient for the purpose. CONSOLIDATE is finally called to write the new keys and responses back to the database.

ANYMORE speaks for itself but you should note the two 'subroutines' DELAY;T and YESNO;PROMPTS. They are called in various places, with parameters passed to them.

ALIST, which is called from the keyboard, allows you to print-out a list of animals or questions.

Last, but by no means least, AAANIMAL will always be displayed on the screen when you EDIT the program file. It is a very useful way of annotating upgrades you have made to systems you develop.

Animal listing on next page



LEISURE SOFTWARE

```

proc aaanimal
rem You are about to play the age-old game of ANIMAL, which
rem dates from the ages BC when logarithms roamed the Earth.
rem
rem Before Computers, you were hard-pressed to find a decent
rem version of this game written for the slide-rule, so the
rem evolution of the 'Computer-as-we-know-it' was necessary.
rem
rem Neanderthal programmers attempted to use BASIC to develop
rem this game, creating only a quasi-database that ran as well
rem as their prototype square wheels, (which are re-invented
rem by each new generation of Homo Programmiens).
rem
rem Now that ARCHIVE has evolved, there can come a whole
rem new species of ANIMAL to be hunted on your QL.
endproc
proc alist
print at 10,10"(Q)uestions or (A)nimals";: let q$=upper(getkey())
open "animal"
all
if q$="Q"
if question$(1 to 1)<>"a"
print question$
endif
else
if question$(1 to 1)="a"
print question$
endif
endif
endall
close
endproc
proc animal
let more$="y"
while more$="y"
reset
order key$a
cls : print question$:delay;5
next
let thinking$="y": let newkey$="": let keysize=0
while thinking$="y"
question
answer
endwhile
if gotit$="y":toldya: else :tellus: endif
anymore
endwhile
endproc
proc answer
if thinking$="n"
print
yesno:" Is "+question$+" what you were thinking of (Y/N)?"
let gotit$=yn$
else
ink 5
yesno:"Please answer yes or no (Y/N)"
let response$=yn$
print at keysize+1,0; ink 3;question$;" ... ";
if yn$="y": print "YES": endif
if yn$="n": print "NO": endif
print at keysize+2,0; ink 7;rept(" ",70)
guess
endif
endproc
proc anymore
print
print
yesno:"Do you want to try to beat the computer again (Y/N) ?"
let more$=yn$
cls
endproc
proc aparse
let animal$=lower(animal$)
while instr(" ",animal$(1 to 1))<>0
let animal$=animal$(2 to )
endwhile
let ok$="n"
if animal$(1 to 2)="a ": let ok$="y": endif
if animal$(1 to 3)="an ": let ok$="y": endif
if ok$="n"
if instr("aeiou",animal$(1 to 1))=0
let animal$="a "+animal$
else
let animal$="an "+animal$
endif
endif
endproc
proc consolidate
let key$=newkey$+oldan$
update
append
let key$=newkey$+" "
let question$=newquery$
update
append
let key$=newkey$+newan$
let question$=animal$
update
endproc
proc delay;t
let x9=0
while x9<t*20
let x9=x9+1
endwhile
endproc
proc guess
let newkey$=newkey$+response$
let keysize=keysize+1
select key$(keysize to keysize)=response$
endproc
proc qparse
let n$=lower(newquery$)
let n=len(n$)
let newquery$=upper(n$(1 to 1))+n$(2 to n)
let n$=newquery$
while instr(" ?.,!",n$(n to n))<>0
let n=n-1
let n$=n$(1 to n)
endwhile
let newquery$=n$+" ?"
endproc
proc question
if count()=1
print " I think it is ";
delay;1
print upper(question$)
let thinking$="n"
else
print at keysize+1,2;question$
endif
endproc
proc start
cls
mode 0
print at 7,20;"A N I M A L"
rem
rem 1985 Holmfirth Academy Ltd. (C)
rem by Pat Crabb
rem based on the DBASE II program of the same name
rem (also by Pat Crabb)
rem
open "animal"
animal
close
mode 1
endproc
proc tellus
cls
input "You win, what was it then ? ";animal$:delay;3
print "How on earth was I 'supposed to know that ?"
aparse
print : print " I've never heard of "+animal$: print
print "Tell me a question that will distinguish "
print question$+" from "+animal$
input newquery$
qparse
print "And for "+animal$+","
yesno:" would the answer be Yes, or No (Y/N) ?"
let newan$=yn$
if newan$="y": let oldan$="n": else : let oldan$="y": endif
consolidate
endproc
proc toldya
let shriek$=" ! ! ! ! ! ! ! ! "
print
print shriek$+"I KNEW IT WAS "+upper(question$)+shriek$
delay;3
rem
rem This is where you can add all the silly
rem bells and whistles that you want.
endproc
proc yesno;prompt$
print prompt$;
let ok$="n"
while ok$="n"
let gk$=lower(getkey())
if gk$="y"
let ok$="y"
print " .. YES"
endif
if gk$="n"
let ok$="y"
print " ... NO"
endif
endif
endwhile
let yn$=gk$
endproc

```


Why group changed its name

SINCE a large proportion of members seem to have difficulty with the pronunciation of IQLUG, we have decided to change the name of the group to Quanta, which has always been the name of the group newsletter. Quanta stands for *QL Users AND Tinkerers Association*, which is a somewhat contrived acronym but no more so than many others.

- I heard recently that Sinclair has just received clearance from CoCom, permitting it to export QLs to Warsaw Pact countries. QLs have been slipping through the Iron Curtain for some time. I heard from someone on the Hungarian import/export agency stand at Compec last year that several people in Hungary had QLs, in spite of the fact that CoCom approval had not been given at that stage.

I was also told that in Poland ZX81s are being used for controlling coal-mining machinery. Perhaps the claim in the old ZX80 advertisements that they could be used for controlling a power station was not so far-fetched after all.

- As usual, we had a stand at the recent ZX Microfair. There was a considerable amount of interest in Quanta and we signed more than 50 new members, including a Sinclair group based in India, where there are eight or nine QLs. About 15 percent of our membership is outside the U.K.

- We have just had a successful meeting in London for 68000 software and hardware enthusiasts. About 30 people heard talks on DIY 68000 systems, among other things. Some proposals were drafted for the specification of a general-purpose peripheral card for the QL, which we are hoping to develop as a group project.

I had hoped someone would bring an Atari ST. It did not materialise but someone had the preliminary documentation, as well as some documentation for the even rarer Commodore Amiga.

- There was a good turn-out for our recent Edinburgh meeting. Talent Computer Systems, of Zkul and GraphiQL fame, gave a very interesting talk about how it develops its software. It uses a Wicat, an up-market 68000-based machine, running under Unix for software development. All its software is written in Stab, a language developed at



Strathclyde University, which is related to C and BCPL.

- One of our members, Ronald Bezzant, has reported the death of a Microdrive cartridge from natural causes. The symptoms were increasing difficulty in making back-ups and noisy operation. It finally expired when he tried to re-format it. It had been in use for about eight months, for about 20 hours a week.

- Another member, Mark Norton, has attached an Oric Atmos keyboard to his QL. Details of the surgical procedure are in the June issue of our newsletter and at least one other member is performing a similar transplant operation on his machine.

- John Tanner puts his cartridges alternately back-to-front, 10 at a time, and then secures them with two stout rubber bands. Tony (Qdos) Tebb has a different solution; he glues the cases together. Another solution adopted by many of our members is to use the plastic boxes in which 35mm. colour slides are returned following processing.

- The group software library is now up to 14 cartridges. The rapid rate of growth

causes problems, in that the library list is permanently out-of-date. All software in the library is written by members, or taken from magazines, with the permission of the original author on the magazine.

Another problem is the sheer number of cartridges needed to supply each regional sub-librarian with copies of the library, in view of the current dearth of cartridges.

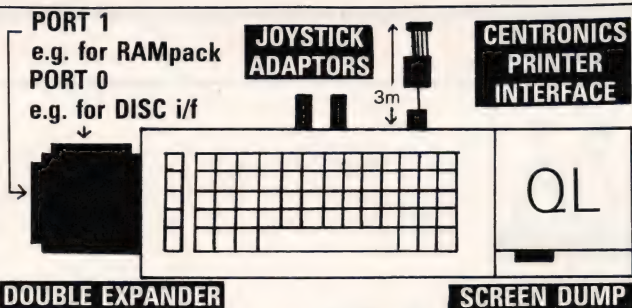
- CPC has been appointed as the official distributor of QL spares. One of our members sent me its stock list and it appears as if every item is available, apart from the printed circuit board. Also available are the service manual, a test cartridge and an RS-232 test cable. CPC will supply spares only to people in the trade, by the way.

- One of our members with EPROM programming facilities is making a collection of all the different ROM versions. Perhaps a market for antique software will develop in years to come.

- Now that the C language is available for the QL, in the form of the GST QC compiler — albeit a subset of full Unix C — I shall be organising a C library on behalf of the group. There is a large amount of public domain software written in C, most of which is available in source code form from the C Users' Group in the States, and could be adapted to run on the QL reasonably easily. Software written by members will also be included, of course.

I have just heard that *Doctor Dobb's Journal of Computer Calisthenics and Orthodontia*, a magazine produced in the States, hopes to publish a public domain version of Unix, written in C for the 68000, which could probably be put on the QL. GST hopes to have a mini Unix-like "shell" available before too long.

- Quanta, publishes a 44-page monthly newsletter, maintains a large, mostly free, software library and provides members with a free advice service. Local groups are supported, and workshops are arranged from time to time in various parts of the country. Membership is £7 for six months. Further details are available from Brian Pain, 24 Oxford Street, Stony Stratford, Milton Keynes, MK11 1JU. Tel: 0908 564271 — Leon Heller.



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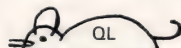
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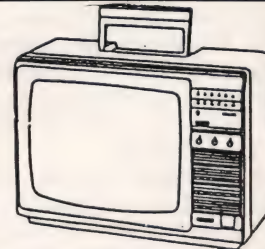
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UNTIL my friend Sir Clive Sinclair started selling computers, my cautious, aged fingers had never pried into the dangers of the keyboard world, writes Victor Serebriakov. I reached my allotted span of three-score years and ten as an acomputerate Ignoramus. Now, a few years later, I have sold several programs and written my two last books on QL Quill. Am I the world's latest developer as a softsmith?

The editor asked why I wrote Tycoon, the crossword business game. The answer is to make money; but, big-hearted, I did not mind if it was also helpful to others.

I felt that the lust for the green blood of zapped allens was sated. I was interested in the interactive teaching powers of micros. As an entrepreneurial type I wanted to teach Life, not curricula. Business is the vital part of Life we need to develop and world power is essential to business, so I looked for a good intersect. What does the business man do as he commutes? Probably a crossword puzzle which polishes his essential communication skills.

Money motivates, but to simulate business and teach business skills one had to assume other skills, those of some specialist trade. The only common skill essential to all business men is wordcraft, so I let that skill represent the specialist knowledge. I wanted the program not to be the same old boring game but a succession of tougher and tougher different games.

So I set up a reward/punishment game. I did it first in Basic but the experts have been at it since. Playing alone I went bankrupt at first but now I can usually approach the millionaire class in solving two of my friend Ken Russell's fiendish puzzles. With more players it is tougher but possible in around four games — for the word-wise tycoon type.

Tycoon is a challenging and stimulating game for up to six players. The aim is to make as much money as possible by guessing the words in a crossword and selling them to the bank. To help you guess, you can buy specific or random letters from the bank — but at a price. Just as in business, you need capital to start and you may have to borrow money at any time, on which you are then charged interest. If you are in funds, you may wish to invest excess cash to gain interest. The computer does all the accounting and gives you up-to-the-minute financial reports to guide your business decisions. Any player who has made more than £10,000 by the end of the game becomes a Tycoon and the overall winner becomes Game Tycoon.



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Please write to Letters Page, The Editor, QL World, Wells House, 80-82 Upper Street, London N1 0NU.

Bad service loses business

SKINGSTON asks (Letters July/August) about a micro for business use. I had to make a choice earlier this year for a system for semi-professional use, mainly word processing, and after careful thought chose the QL. I would like to advise others not to make the same mistake.

Superficially, the QL has many attractive features for the price. The Microdrives are incomparably better than tape cassettes, the software offered with the machine looks good, but it falls down completely on reliability and service. The combination of those two problems makes it completely unsuitable for anyone who wants a computer for anything other than leisure use.

I am now on my second faulty machine and cannot possibly get it serviced, because Sinclair is talking about a turnaround time of above 10 days, excluding carriage each way. I did not buy a computer for fun; I bought it because I needed to use it and, having committed myself, I cannot be without it for so long. So I struggle on with a dodgy Microdrive and a screen which blanks out intermittently.

The local shop where I bought it cannot help, other than sending it back; it does not usually deal with Sinclair machines for precisely those reasons.

Until Sinclair can sort out its problems, the best advice to anyone needing a machine for serious use must be to choose a reliable machine which can be serviced easily, such as the BBC.

**K N Frayn,
Manchester.**

● *Thank you for bringing this problem to our attention. We are planning a feature on servicing of QLs both by Sinclair and outside repair companies. In the meantime, we will attempt to get some reply from Sinclair to your problem.*

Painting by joystick

RECENTLY I visited the ZX Microfair in London and saw a program to draw colour pictures on the screen, similar to the MacPaint system on the Apple Macintosh. Can

you tell me who produces it and if there are many other, perhaps better, systems?

I own a QL and there is a colour printer at the college where I study art. As you can appreciate, the program must be able to dump the picture on to the printer, because I cannot send the screen program to my A level examiners.

I do not know if a picture created on a computer would be accepted. My tutor believes that if a mouse, or joystick, were used, I could describe the work as a freehand drawing, while a picture created pixel by pixel would not be permitted. With that in mind, is there a mouse available and, more important, is there software for such a device?

**Colourful and confused,
Cambridge.**

● *There is an increasing number of 'painting' programs for the QL. They include the GraphiQL package from Talent, the Medic M-Paint program and Paint Master from Shadow Games. The program you saw could have been any one of those three.*

As for the mouse/joystick input, you should have no difficulty using a joystick with any of the programs mentioned, although it is unlikely you will be able to obtain a mouse for use with the QL yet.

Messages from a medium

I HAVE owned a Sinclair QL for nearly six months and my ability to program has developed considerably but I am still plagued frequently by Bad Medium messages which claim important files and create a great deal of work and many headaches.

I would be grateful if you could find a method of recovering data from cartridges which throw up this error. Alternatively, can I re-format the cartridges which give me such problems?

**Mad about medium errors,
London**

● *To deal with the second part of your question first, it would be wise to send your QL for a check if it is constantly throwing Bad Medium messages, as the hardware is more likely to be defective than your cartridges. While it is true that Sinclair had problems with early versions of the Microdrive on both the Spectrum and the QL, they were almost completely eliminated about a year ago and you have every right to expect yours to work reliably.*

As for recovering data already lost, the new Talent Cartridge Doctor could be just what the physician ordered. Talent claims its £21.95 program "is designed to recover information from corrupted Microdrive cartridges and uses Artificial Intelligence incorporating a powerful rule-based expert system, so this recovery process is almost automatic." Why not try it?

Acronym league

Reprinted courtesy of QLUB News

I suggest that only a minority of your readers are in the QDOS, QCON, QMOD, QCALL, QNET league and that there are many others, like myself, who are still struggling to write simple programs. The main frustrations arise from:

Error-ridden manual: I am aware of a multitude of errors in the manual I received in June, 1984.

No index in the manual: Please use your influence to persuade the User Guide Editor to publish an index.

My need for a printer: I am not prepared to spend more than £300 on a printer which will not work on the QL and might involve another £75 before it does. Please publish a printer survey as soon as possible.

Psion Support Service — My one enquiry at least produced a reply but, alas, in the form of a stereotyped answer to a different question.

Having used the ZX-81, its RAM pack, printer and manual successfully for some years to write complex mathematical programs, I do not consider that programming the QL should be beyond my capabilities.

**D H Moxon
Leigh-on-Sea, Essex**

Frivolous pursuits

THE FIRST issue of QL World came through my letterbox with my QLUB News. Thank you very much. The magazine looks good and I am looking forward to Issue 2.

May I make a plea for those who also use our QLs for more frivolous pursuits? In my case, playing adventure games. I know that there are few of them at the moment but even two column inches for those who are confused—in ZKUL, for instance—would help.

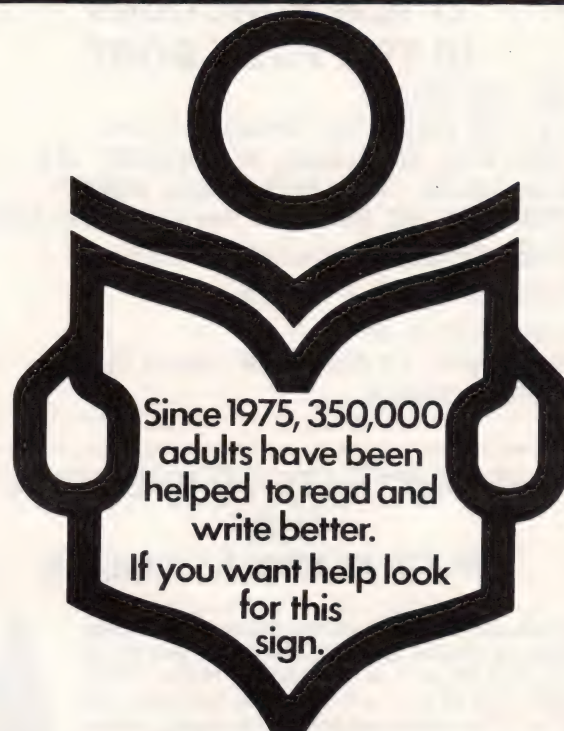
**Marion Taylor,
Barbican, London.**

● *This is your magazine and if that is what sufficient readers want, we will do our best to accommodate them. Tell us what you think of the idea.*

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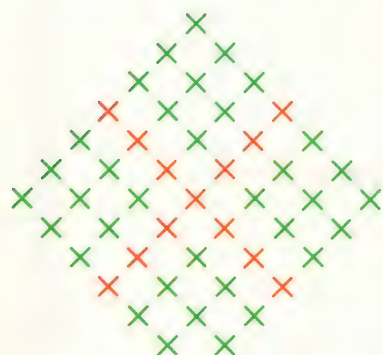
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QLUB

News for the QL user

ISSUE No. 7 SEPTEMBER/OCTOBER 1985

QL software unleashed

Good software for the QL takes a long time to develop but when it has arrived, you soon find it was well worth the wait.

It should be no surprise, then, that one year after the Psion QL Chess became the first leisure software released for the QL, more top-quality games are starting to appear in abundance for the machine. As usual, Psion is heavily involved in supporting this end of the market and has released Match Point, a tennis simulation employing fast action graphics, full player control using joystick or keyboard, and three levels of play.

If you prefer a more traditional zap-'em game, QL Meteor Storm should be in your galaxy. It is an asteroids-style game which offers different levels of play, high-score tables, joystick control, and more frustration than you can possibly handle. A more considered approach is taken with the strategy game QL Reversi which offers a challenging version of the classic Othello board game. You can play against the computer or

a non-electronic friend.

Perhaps the most intriguing new game of all is an interactive full-text adventure game. It features independent-minded characters each with their own goals, and uses multiple containers, e.g. keys within wallets within jackets within cubicles. A wide

range of English-language commands is accepted by the flexible and forgiving command-language.

Details of this new leisure software, as well as other new software, can be found in a special two-page edition of Software Update included in this issue.



Sinclair pocket televisions offered for prizes in our Spring QLUB competition were won by D S Hay of Aberdeen, M Dumonde, Northwood, Middlesex and R D Waitt, Barnet, Hertfordshire. They qualified by correctly answering that the TV uses only one microchip to control all its operations, that the first primitive colour TV broadcast took place in 1929, and that John Logie Baird pioneered the first 'mechanical' TV system in the U.K.

QL shows off at the shows

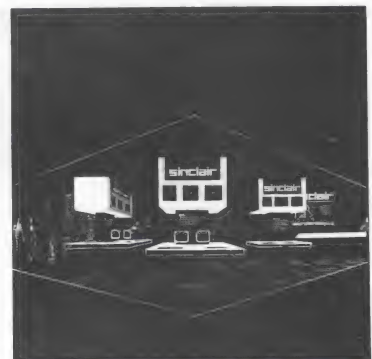
The QL has been making its rounds of the major computer shows in recent months and a flock of third-party peripherals and software have followed it around.

The first of the shows was the famous ZX Microfair, which manifested its 16th incarnation at the Royal Horticultural Hall in London in June. On display were a number of 3.5 inch and 5.25 inch disk drive systems, modems, languages and games for the QL.

Probably the biggest draw at the exhibition was the volume of new software for the QL. On show were not only new arcade and adventure-style games but also business programs, utilities and programming lan-

guages. The growth of development in the latter category has been truly astounding, with almost every major micro-based programming language now available for the QL, including Pascal, C, Forth, BCPL, LISP and several monitors and assemblers.

The QL is next set to trip the light fantastic at the Personal Computer World Show in early September, an event which may have taken place by the time you read this. If, however, you are sharp-eyed enough to read QLUB News when it is hot off the press, you probably still have a day or two to plan to attend the show at Olympia, London from September 4-8.



sinclair

Building with the QL

You and your QL are probably well-used to one another by now. It with its two Micro-drives, expansion ports, keyboard – and you with your well-calloused keyboard fingers.

You may well feel the need to inject more excitement into your relationship with the machine, perhaps to dress it up a little, make it feel more powerful and give it more responsibility. To do so, you will have to give the QL the tools it will need to undertake that extra responsibility.

Those tools may include a new printer, disk drive system, modem or perhaps simply a monitor. They should be considered as part of some overall plan for your QL system. Given the proper kind of help, the QL could be anything from a dedicated professional wordprocessor to a lawyer's database management system of case precedents. It all depends on how you plan and develop your system.

Unlike any other type of household appliance, no single application can be said to be the QL's primary function. It is what you make of it. If, for example, you are planning to do a great deal of writing and wish to use the QL primarily as a word processor, you might look to buy a correspondence-quality printer and a monochrome monitor.

If, on the other hand, your primary purpose is to develop and maintain a large database, you should probably consider disk drives and a dot-matrix printer. Only you can decide what you need to obtain the most from your QL. If you do so with specific tasks in mind, you are much more likely to be successful.

A list of third-party peripherals for the QL is available by writing to Sinclair Research, Stanhope Road, Camberley, Surrey GU15 3DL. It is not a list of recommended products but merely a collection of names, addresses and specifications provided as a

service. Sinclair Research cannot be held responsible for any peripherals purchased from third-party suppliers, nor can the list be said to be comprehensive.

WELCOME TO THE QLUB

This is the first newsletter that you, as a new QLUB member, will receive over the next twelve months. Psion will only support members who supply valid membership numbers. This number is given on the address label attached to the front of this newsletter.

Psion Software Support Limited supply a comprehensive support service on QL Abacus, Archive, Easel & Quill, Qdos, Super-Basic and any related peripherals – eg. Printers or memory expansion boards. Psion may be contacted by writing to:

**Psion Software Support
Psion House
Harcourt St.
London W1H 1DT**

Q LETTERS

QL expansion examined

Recently I bought a QL with a Microvitec Cub colour monitor. When I have come to grips with the QL software, I would like to buy a modem and a printer for it. I have the following questions; can you please give me some advice?

1. Can a modem and a printer be connected at the same time, or will I have to re-cable?
2. Is it possible to buy these items with cables and software included or do I have to become a technician and programmer to make them work?
3. I want a modem with 1200/75 and 300/300 baud and a printer with NLQ, the printer costing no more than £400. Can you recommend any please?

Alex van Tricht
Ashford Hill, Berkshire

Editor's reply: Yes, a modem and printer can be used at the same time, provided that the printer is plugged in through serial port 1 and the modem through serial port 2; or vice versa. Fortunately, most of the companies which have developed modem systems for the QL, including the Tandata Q-CONNECT system, count on you using serial port 1 for a printer and configure their modems to operate through serial port 2.

As for printers, modems and cabling, Sinclair is hoping soon to announce a printer for the QL which will more than meet the requirements you list and would include the appropriate cabling. The Q-CONNECT communications system also includes all the cabling necessary to plug-in-and-go. Although the Q-CONNECT system does not at present include the 300/300 baud specification, Tandata can assist you in obtaining it with its TM512 modem.

News from the bored ROM

While browsing through the QL ROM in a fit of boredom, I discovered a 'WHEN ...END WHEN' construct which is obviously intended for error-handling. When I tried this, however, I got the 'Not Implemented' error message. Does this mean that a new ROM is to be made available? Is there any other way of implementing error-trapping on the QL?

Nigel Freeman,
Coventry Polytechnic.

Editor's reply: It is Sinclair Research policy to look continually for ways to improve and update all products including the QL, but we are not intending to release a new ROM version. Occasionally, new keywords

are introduced for production purposes and should not be used in programs unless documented. At present there are no alternative ways of error-trapping.

The QL and its Kiwi fans

U.K. owners of the QL interested in correspondence with New Zealand QL owners can now do so through the New Zealand QL Users' Club. The address is:
NZ QL Users' Club
28 Stokes Road
Epsom, Auckland
New Zealand

Editor's reply: Nobody can say QL owners are not cosmopolitan. We welcome this invitation from Pete Avery in New Zealand but remind readers that QLUB News and QLUB membership are available to U.K. users only – although we appreciate that good news sometimes travels round the world. If you live outside the U.K. and wish to enquire about QL QLUBs in your country, contact your national Sinclair distribution agency or the Sinclair Research U.K. Export Department at 25 Willis Road, Cambridge CB1 2AQ, England for your distributor's address.

HARDWARE UPDATE

You should now be able to buy official Sinclair 3.5 inch disk drives for the QL. As this issue was going to press, an agreement was signed with Micro Peripherals which means that company's disk drives will be offered under the official Sinclair label.

The system offers full integration with the existing QL Qdos operating system and will allow higher-capacity data storage and faster access times than are possible with existing QL Microdrives. Each floppy drive has a formatted capacity of 720K and thus offers about seven times the amount of space on a Microdrive cartridge.

Cloneable and non-copy protected software should be easily transferable to the disk system and both Microdrive emulation and disk drive-specific access commands are included. The small, lightweight drives are designed in QL black and the interface to connect them to the QL plugs into the QL expansion port is at the left-hand side of the machine.

The disk drives are available from many QL stockists or direct from Micro Peripherals at INTEC, Unit 3, Hassocks Wood, Wade Road, Basingstoke, Hampshire, Tel. 0256-473232. Enquiries should also be directed to that address.



The disk drives are not, however, the only peripherals being developed for the QL. At press time, an agreement was also imminent on plans to offer an attractive NLQ printer.

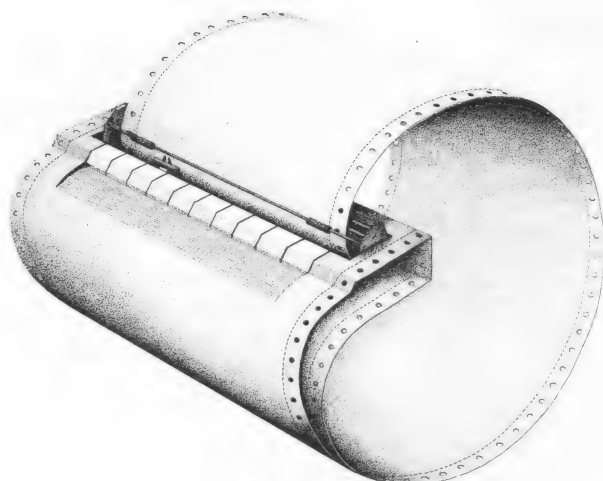
Tandata's Q - CONNECT modem system also expands the increasing number of hardware Options for the QL.

The printer, incidentally, also has another international plug-in-and-go advantage as it can use the QL foreign language character sets to produce documents in a variety of languages, a particularly valuable feature for language students.

The QL is getting support from third-party peripheral manufacturers as well. Storage experts Cumana announced as we were going to press that it expects to offer an OS-9/68000 environment and disk interface for the machine.

While we are not endorsing the product and have not yet had the chance to test it, the specifications are interesting. The hardware includes a double-density floppy disk controller for up to four drives, a Winchester hard disk interface, a RAM expansion unit up to 512K, a ROM expansion unit up to 144K, both parallel and serial printer ports, a mouse interface, a battery-backed calendar and a graphics kernel.

The promised software claims to offer a full implementation of the well-known Unix-like OS-9 operating system, a word processing system with spell-checking and mail merge, a spreadsheet, interactive Basic compiler, both C and Pascal compilers, a screen editor and relocatable macro assembler. Prices and availability have not yet been released and Cumana, NOT Sinclair, should be contacted for details: - Cumana sales office, Unit 7, The Pines Trading Estate, Broad Street, Guildford, Surrey, Tel: 0483-503121.



SOFTWARE UPDATE

Get ready to buy more shelves for your software. Ours are already sagging with the weight of new releases in the games, utilities and business software departments. To give you a chance for a detailed examination of the new releases, look at the reviews below.

In this issue, we profile both QL Entrepreneur and QL Meteor Storm. You will also see a list of some of the better entertainment software in a box on the page opposite. We start by looking at the most serious of those two new releases, QL Entrepreneur.

In an age when unemployment is rising and the economy seems buffeted by good or ill winds which blow from across the Atlantic, it is not surprising that many people have turned to entrepreneurial self-employment as the answer to their financial troubles.

The problem, however, is that too many people go into business ventures without doing much, if any, forward planning and find themselves either bankrupt or hopelessly overdrawn before the end of their

first year. QL Entrepreneur is directed at eliminating that kind of misfortune.

The authors, Triptych Publishing – profiled on page six of this issue – define the £39.95 program as “a complete learning and applications course designed to help you through the complex process of determining the viability of a new business venture”. The program works on two levels, either as a teaching aid for those uninitiated in business practice and/or an analytical business tool.

To obtain the most from the program and have a successful business, you would be well-advised to run through the teaching portion of the program first, as it reviews many basic accounting and book-keeping concepts which are easily muddled if they have fallen into disuse.

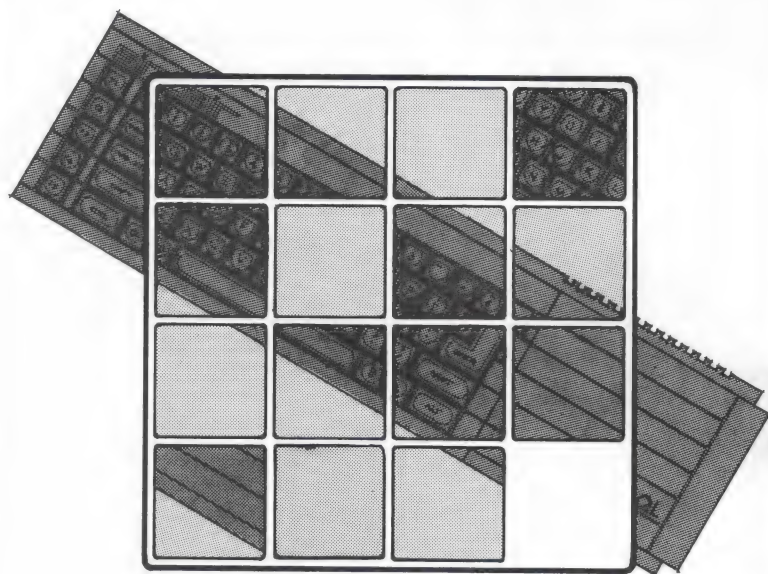
The background information is clearly written and helpful. Here is a sample from the second chapter:

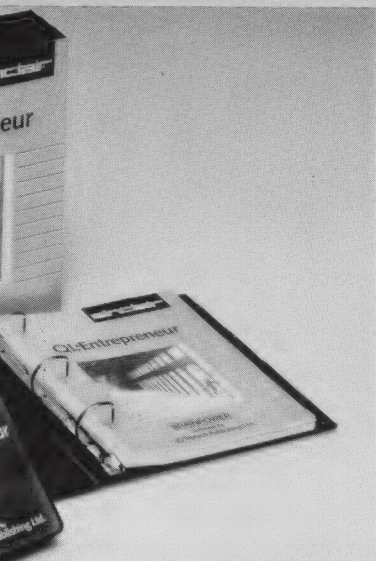
“For most people, the ideas for their new venture will come together in bits and pieces. The idea for a product might come one day, its packaging another, and the marketing angle you feel will really get the message across will come on yet another day.....”

**‘The moment you
it instantly
number of sma
one of which
termina**

Once the basic business concepts have been covered, the program explores using numbers to develop a business plan, how to run a balance sheet, when you are really making a profit, the importance of having sufficient cash, how to handle VAT and company tax, and how to develop a balance display sheet. The program is for anyone interested in how business works and is essential for any prospective entrepreneur, so much so that the QLUB editor has just run off with it to ponder the mounting numbers of zeros on his bank balance. The program is available from QL stockists or you may order direct from Sinclair by completing the form on the back page of this issue.

After all that high finance, you may well be in the mood to blast a few on-screen asteroids.





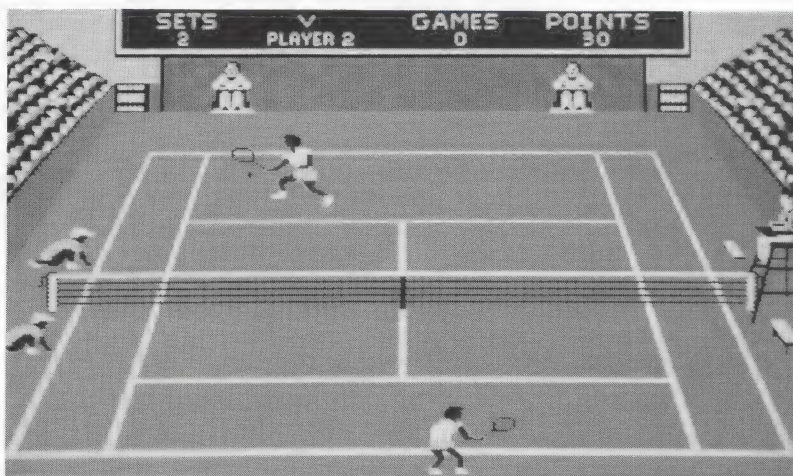
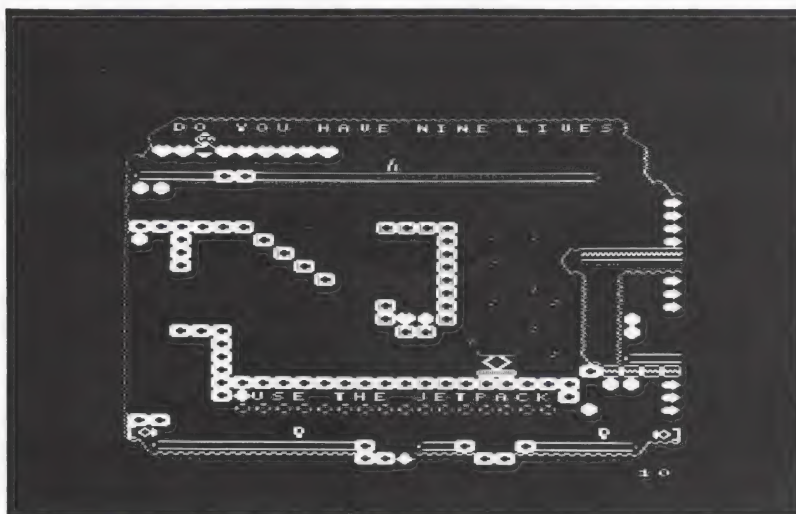
With a copy of the QL Meteor Storm, you will be in a position to do that.

This high-speed implementation of the arcade classic features multi-player, multi-level gaming with high score tables, joystick control and the meanest-looking crop of space junk I have seen since Halley's Comet last visited this planet – not that I was around then.

u blast a meteor,
breaks into a
ller pieces, any
could do you
l injury'

To refresh the memories of those who have not yet had the pleasure of playing this genre of game, I should explain that it pits you, as the captain of a small but agile space cruiser, against the vagaries and whims of an ever-increasing storm of meteors – and anti-social enemy spaceships keen to assist the meteors in your destruction. You can avoid destruction but it is not an easy task.

The moment you blast a meteor, it breaks up instantly into a number of smaller pieces, any one of which could do your ship a terminal injury and must be destroyed before it does so. While you are busy fending off this shrapnel, the aforementioned enemy ship is apt to fly past and lob missiles at you. The £12.95 program will be available in the near future from QL stockists and direct from Sinclair.



The game's the thing

Everyone knows that QL users are a little more serious and responsible than the mainstream of micro users – don't we? – but that does not mean we cannot appreciate a good game when we see one. Among the better games software titles available for the QL are:

- **QL Meteor Storm:** The new zap-'em arcade game profiled in the article opposite should make a welcome addition to any game-player's arsenal.

- **QL Reversi:** A £12.95 strategy game based on the classic board game, (also known as Othello), which offers joystick or keyboard control and features several skill levels. The program will be available in the near future direct from Sinclair and many QL stockists.

- **QL Cavern:** The £12.95 arcade game which became a QL favourite within weeks of its release and is still the best of its type.

- **QL Chess:** A championship-level implementation of computer chess featuring stunning three-dimensional graphics, a host of commands and a variety of skill levels. This £19.95 winner of the World Microcom-

puter Chess Championship has received rave reviews.

- **Match Point:** A £14.95 tennis simulation from Psion, the authors of QL Chess and the bundled QL applications software. Match Point includes fast action graphics, full player control, joystick or keyboard control, user-definable keys, single and twin player options and uses official lawn tennis scoring and rules. Please contact Psion Ltd, Psion House, Harcourt St, London W1H 1DT with enquiries or orders.

- **COMING SOON TO A QL NEAR YOU:** An amazing text adventure. It will sell for £19.95 and feature you as the star of a fantastic story in which the characters all have independent ideas about how to behave and attempt to induce you to perform tasks for them. It offers a flexible command language and employs the concept of containers – objects having weight, things being inside things, things being tied to other things. The game features an extensive vocabulary and will be a real challenge for adventurers. The program will be available in the near future.

Corporate QLose-up: Triptych takes off

If you have a completely new idea, you have one major problem in marketing it – how do you convince people that they need it?

For Triptych Publishing, that proved to be no difficulty at all; when it launched earlier versions of its Brainpower range of tutorial/applications packages for a variety of micros last year, the press did all the explaining.

The warm welcome from press reviewers was followed by a triumph in this year's British Micro Computing Awards. The Brainpower series won Triptych a finalist placing in three categories, more than any other software house, and the Personal Computer World Home Software Award went to a Brainpower title, *Entrepreneur*. Presenting the award, Sir Alastair Burnet described *Entrepreneur* as "the product which brought business decisions to home computing".

A generous comment, but what is it that makes the Brainpower range so successful? "We wanted to produce really useful applications programs that would, for example, help people solve practical business or personal finance problems," says Triptych managing director David Juster.

The three titles launched by Sinclair for the QL in April give an indication of Brainpower's practical intent. QL *Entrepreneur* is a complete small business start-up kit, QL *Project Planner* teaches and applies the principles of critical path analysis, and QL *Decision Maker* provides a powerful tool for resolving complex decision-making problems.

What the titles do not tell you is that these programs are enjoyable to use. The screen displays have been carefully designed to give colourful graphic presentations of key points and concepts. For your money, you get the best of two worlds and more: one reviewer confessed that he had derived considerable entertainment from using QL *Entrepreneur* as a simulation game building business plans for those 'cannot-fail' ideas we all have and seeing whether they'd work. All the excitement of business, with none of the risk.

Juster's one regret about the Brainpower series is that the products were not available when Triptych went into business. He and the company's other two co-founders met at the London Business School on the Sloan Fellowship scheme, a prestigious one-year crash course for young executives of exceptional promise. All three were in their early 30s but from widely differing backgrounds.

"I had become convinced that computers were a good thing," says Juster, "so I bought one. Then I was not sure what to do with it.



Triptych's three directors and co-founders L-R: Duncan Baird, David Juster and Stuart Armstrong

So I had to identify other computer buffs on the course and pick their brains." Juster was an Army officer. The other buffs he found were Stuart Armstrong, an Australian civil engineer and now Triptych technical director, and Duncan Baird, a publishing distribution expert.

Triptych, the choice of company name, was apposite. They brought three different points of view to bear on a single theme and the result has been a picture of success.

In the summer term of 1983 they sought finance, armed with a 100-page business plan which would have had most bank managers handing over the keys to the vault on a velvet cushion. Soon afterwards they were in business, with a team of programmers hard at work for a long time. It was not until September, 1984 that Triptych was ready to unveil its first six Brainpower titles.

Sales projections were exceeded. Amsoft commissioned Triptych to provide Brainpower conversions for the Amstrad Micro; CBS sought and agreed a European distribution deal; Marks & Spencer commissioned Triptych to program its first excursion into micro software, which sold 200 copies at the Marble Arch branch before lunch on the day it was launched; Collins, Britain's biggest independent book publisher, launched its new software

imprint, Collins Soft by buying the U.K. rights to the first six Brainpower titles for a range of low-cost home micros.

Now Sinclair has provided its endorsement by commissioning QL versions of three Brainpower titles and the additional power of the QL has given Triptych the opportunity to develop greatly-enhanced approaches to its original ideas. On the QL, the Brainpower series is even more powerful.

The QL version cost £39.95 and gives you a good deal of code for your money. Despite the compression Triptych programmers have achieved, the packages run to three Microdrive cartridges per pack. That is on top of the extensive manual which is part of the kit. As one reviewer wrote of the range: "It would be better for me to write the review in a year's time, as they all lend themselves to in-depth study".

Clearly, the Brainpower philosophy is closely in line with the thinking of many of the people who chose QL as the machine which meets both their personal and business needs.

If that leaves Triptych with a problem now, it is that it has given itself a difficult act to follow, but it is not too worried. "Suffice it to say," says Juster, "that we know better than anyone else what we are trying to improve on."

The Psion problem page

Problem: How do I make partial recovery of a corrupted database file?

Answer: First, it is imperative that you develop the habit of making frequent back-ups when updating/modifying your database files.

It is also advisable to have an EXPORTed back-up of your file because it is easier to inspect the file and isolate the bad records. Try to make sure that you are never in the position of losing more than two hours' work.

Provided that your Microdrive cartridge has not been too badly damaged, you should be able to use LOOK to open the database file for reading. The strategy is to find the first and last corrupted record and then to copy the uncorrupted records into a database file on to a second cartridge. Follow this procedure:

Boot-up QL Archive and place the cartridge containing the corrupt database file in MDV2_. Type in the following commands to locate the first corrupted record:

LOOK "mdv2_bad file":display:all: sprint:print recnum():endall

This procedure will display all uncorrupted records together with their position in the database. When trying to print a corrupted record, QL Archive may crash or it may report an error – i.e., incomplete file transfer – or something unusual for you to realise that you have reached a corrupted record.

Note the last record number reported by the short program above. If QL Archive crashed, then boot it up and open the file for reading again using LOOK. Go to the last record using LAST. Then type-in the following commands for locating the other extreme of the corrupted records:

let n=1: while n: print recnum(): back: endwhile

Once again, you will see something unusual or perhaps QL Archive will crash. Make a note of the last uncorrupted record. If QL Archive crashed, then boot

Help press F1 Prompts press F2 csmerge menu output start	EDIT LINE Alter line and then press ENTER <pre> proc start create "customer" name\$ address\$ tele\$ contact\$ credit endcreate input "Customer name to enter "; name\$ if name\$="Turbo" oil else if name\$="Coal" endproc endif endif endproc if name\$="Turbo" </pre>	Commands press F3 Xchange task F6
---	--	--

It looks like QL Archive, but it's not. Above is Psion's X change Archive for the IBM PC – which can use Archive programs written with the QL.

it up again. Invoke the program editor (EDIT) and type-in the following procedure:

PROC RETRIEVE:

LOOK "mdv2_bad file"logical"bf"
CREATE "mdv1_copy"logical"c"

(create a database with the same structure)
 (type in all the field names. I am going to have two fields)

a\$
b

ENDCREATE

use "bf": let upto=20 (this number is the record preceding)
 let n=1 (the first corrupted record (SEE ABOVE))
 while n<=upto
 let c.a\$=bc.a\$: let c.b=bc.b
 append "c": let n=n+1: next

endwhile

number is the record following the last corrupted record. Substitute with the one which applies to you.

While not eof (bc)
let c.a\$=bc.a\$: let c.b=bc.b
append "c"
next
endwhile

This second WHILE loop copies the second batch of uncorrupted records.

close
close
endproc

Now remove the QL Archive cartridge from mdv1_ and insert another formatted blank cartridge to which you will copy the uncorrupted records and invoke the procedure RETRIEVE.

That will then retrieve most of your records. You will, however, have to re-create the lost records somehow, perhaps by referring to a back-up file. Mark the cartridge in MDV1_ as your working cartridge; re-insert QL Archive into MDV1_ and reformat the old cartridge MDV2_ for re-use.

The above copies all records up to the first corrupted one position 35. That

Programmer's forum

Although only eight solid colours are available on the QL screen, the use of stipples provides a way to blend them so that the apparent number of shades is much greater.

Every single pixel, picture element, better understood as "dot" on the screen can have any one of the eight basic colours, so by colouring adjacent pixels with different shades, the composite when viewed from a distance appears to be in an entirely new colour. That is the principle behind stippling.

A stipple colour is specified by giving the QL three numbers. The first two give the two colours used to colour the dots. The third (a number from 0 to 3) gives the stipple pattern which dictates how the dots are arranged.

PAPER 4,2,0 CLS

sets the paper colour to a stipple of green – colour 4 – and red – colour 2 – using stipple pattern 0. The stipple pattern refers to the position of pixels in the first colour relative to those in the second. If you take four pixels arranged as shown below, you can use the stipple number to determine which of the four pixels are shown in the first colour and which are shown in the second:

1	2
3	4

Stipple pattern 0 corresponds to pixels 1, 3 and 4 being in the main colour and pixel 2 being in the second colour.

Pattern 1 has pixels 1 and 2 in the main colour and pixels 3 and 4 in the second colour, pattern 2 has 1 and 3 in the main colour and 2 and 4 in the second colour, and pattern 3 has pixels 1 and 4 in the main colour with pixels 2 and 3 in the second.

If you consider the four-pixel pattern as being spread across the entire window, you can imagine that each pattern has a distinctive appearance. Pattern 3 appears as a very finely-divided chessboard, while pattern 1 appears as a pattern of horizontal lines.

Try a few combinations now but remember that in high-resolution mode, mode 4, only four colours are available – black, red, green and white – so the patterns will not be coloured so vividly.

Although typing in all three parameters to PAPER, INK, STRIP and so on to obtain the required stipple is probably the easiest way of getting the stipple colour you want, it is fairly long-winded. If instead you follow a particular formula, it is possible to specify the stipple colour as one number. For example,

PAPER 18 CLS

**'Although stipples
are fairly awkward
to get used to,
the effort is
worthwhile'**

produces just the same effect as

PAPER 2,0,0 CLS

To determine why, you need to consider each element of the colour as a binary number. Take the main colour; in your case, this is colour 2, which is red. If you represent 2 as a three-digit binary number, you get

010

You must then take the second colour, which is 0, or black. 0 as a three-digit binary number is

000

You must then XOR the two colours together. XOR stands for 'exclusive-OR', which produces a binary '1' if the two things being XORed together are not the same, and a binary '0' otherwise. In other words, if you XOR 010 with 000, you get:

010	XOR
000	
010	

The result happens to be the same as the first number as zero has been added. You must then treat the main colour as the lowest three binary digits of an eight-binary-digit number and the result of our XOR as the next three bits:

nn010010

The final two bits, 'nn' above, are filled with the stipple pattern. Stipple pattern 0 is 00, pattern 1 is 01, pattern 2 is 10 and pattern 3 is 11. You are using pattern 0, so your final number is

00010010

If you convert this back into decimal, you obtain

18

which is the number you used to achieve the same effect.

A major headache with the use of stipples is working out the ink colour which, when super-imposed on the stipple, will produce legible writing.

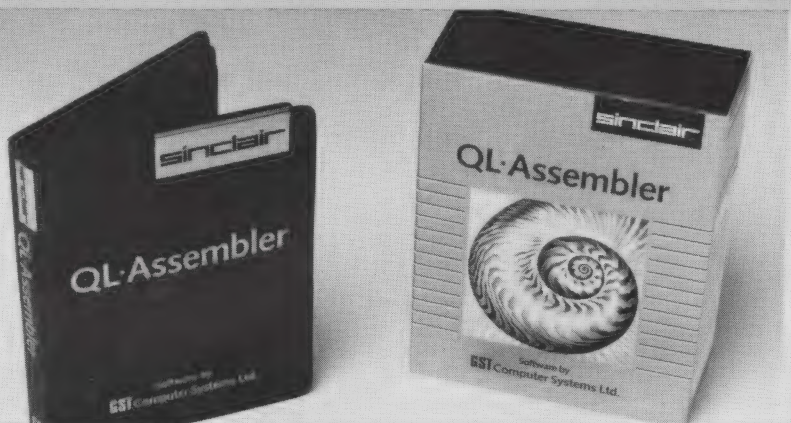
A particularly suitable colour for the ink with our paper colour of 18 is white, which is colour 7. So, if you opened a window,

100 OPEN#3,scr_400x200a56x0

110 PAPER#3,18:INK#3,7:CLS#3

you could then print things to channel 3 in the normal way, the difference being that each printed item does not appear as boring old green ink on black paper but as white ink on a red/black mixture.

Although stipples are fairly awkward to get used to, the effort is worthwhile. By choosing the correct stipple patterns and colour mixtures, all kinds of colour effects can be achieved. The important thing to remember is that a stipple pattern will almost certainly look very different in the two screen modes.



Using Sinclair's QL Assembler, you can move beyond Super BASIC into defining even more powerful programs

Machine code

For people used to BASIC, Super or otherwise, the speed of machine code in some applications is difficult to grasp. That is particularly true when moving around large amounts of data, something at which machine code excels.

The Super BASIC loading program is listed immediately below. At left is the machine code listing.

In this issue, we look at the possibilities for manipulating the special 32K portion of memory which starts at \$20000 – the screen RAM. Shifting the screen memory around has the added advantages that the consequences are displayed graphically and are relatively unlikely to crash the machine but, of course, 32K of data requires speed.

The program FLIP allows you to save a screen in RAM and recall at will. It could prove useful for help screens, games and making copies of graphics screens under development. The principles are the same as those used for pull-down menus and the like, except they involve less of the screen, so they might also provide some ideas for more advanced readers.

Three keywords are added to SuperBASIC, SAVE_SCR, SHOW_SCR and FLIP. SAVE_SCR will save into its own area of RAM, the current screen display, replacing any previously SAVED_SCR.

SHOW_SCR will over-write the current screen display with the SAVED_SCR; FLIP will swap the screen display with the SAVED_SCR, so another FLIP will restore the status quo. Thus a screen which took some time to draw could be drawn once, saved using SAVE_SCR, and then FLIPped on to the screen at any later time in about one second, without destroying the current screen display, which is restored with a further FLIP. SHOW_SCR destroys the current screen but is faster than FLIP.

```

100 REMark Basic loader for FLIP
110 checksum=0
120 base=RESPR(512)
130 num_bytes=140
140 RESTORE 1000
150 FOR offset=0 TO num_bytes-1
160 READ byte
170 checksum=checksum+byte
180 POKE base+offset,byte
190 END FOR offset
200 IF checksum <> 10779:PRINT "Wrong data!":STOP
210 CALL base
1000 DATA 34,60,0,0,128,0,116,255,112,24
1010 DATA 78,65,74,128,102,18,71,250,0,118
1020 DATA 38,136,67,250,0,12,52,120,1,16
1030 DATA 78,146,66,128,78,117,0,3,0,38
1040 DATA 8,83,65,86,69,95,83,67,82,0
1050 DATA 0,38,8,83,72,79,87,95,83,67
1060 DATA 82,0,0,38,4,70,76,73,80,0
1070 DATA 0,0,0,0,0,0,97,38,34,218
1080 DATA 81,201,255,252,66,128,78,117,97,26
1090 DATA 36,217,81,201,255,252,66,128,78,117
1100 DATA 97,14,38,18,36,209,34,195,81,201
1110 DATA 255,248,66,128,78,117,71,250,0,18
1120 DATA 34,83,36,124,0,2,0,0,34,60
1130 DATA 0,0,31,255,78,117,0,0,0,0

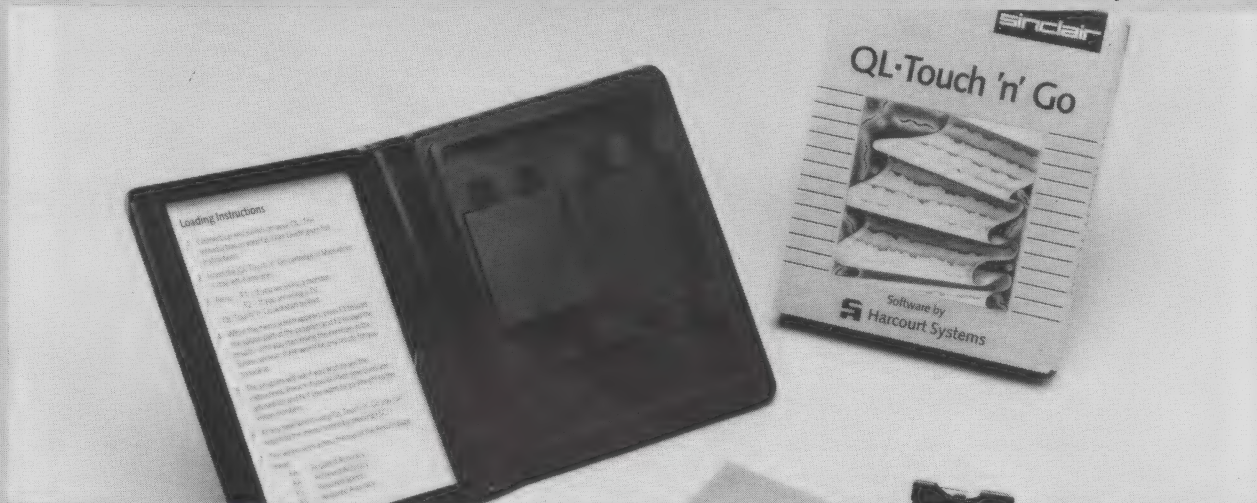
```

The program demonstrates several points; the linking-in of keywords to SuperBASIC, the allocation of memory in the common heap area, the use of subroutines and some of the versatile addressing modes available in 68000 assembler.

The first requirement is to allocate some memory for the RAM screen, using the Qdos trap MT.ALCHP, which provides space in the common heap area. The trap

returns the address of the base of the heap space in register A0 and the program saves it in a data storage area, HEAP_START.

The next job is to link in the extra keywords using the vectored utility BP.INIT. That causes the extra keywords to be recognised by SuperBASIC and tells the interpreter where to find the routine to be performed if one of the keywords is used.



If fumble-fingered keyboard use is holding you back from programming, you may want to consider the QL Touch 'n' Go typing tutor.

and more....

Listing 2

Finally, the routines are described. As all of them require register A1 to point to the base address of the heap, A2 to the first screen location, and D1 prepared to act as a loop counter, the setting up is performed by a subroutine.

The instruction at the beginning of each routine is therefore BSR.S, or branch to subroutine. The instruction pushes the address of the next instruction on to the stack and then executes the subroutine.

When the subroutine ends with RTS or return from subroutine, the Program Counter assumes the value of the top of stack, so program execution continues with the instruction after the BSR. The 'S' appended to the BSR can be used when the subroutine is fewer than 128 bytes away and shortens the opcode. The SAVE_SCR routine then moves to the label FILL_HEAP, which uses the very convenient post-increment mode of addressing.

The instruction moves the contents of the location pointed to by A2, the first long word of the screen memory, to the location pointed to by A1, the first address in the heap. It then adds the appropriate amount to A1 and A2, 4 in this case, so that they point to the next long word location.

The next instruction, DBF, means decrement and branch until false; some assemblers use DBRA. Remembering that we have set D1 to the number of long words in the screen-1 the instruction will cause FILL_HEAP to be executed \$2000 times, transferring the whole screen - it takes only a second or so.

SHOW_SCR does exactly the same as SAVE_SCR but in reverse - it transfers the contents of the heap to the screen.

FLIP is slightly more complicated because we wish to swap the contents of heap and screen. There are various ways of doing this; in this case register D3 is used as a buffer so that a screen memory location is vacated before the heap value is moved into it. D3 can then be moved to the heap address.

To use the program you have a choice - either type in the SuperBASIC listing, save it and run it - or if you have an assembler, you could enter the source code and assemble it. Please note that some assemblers will require slightly different notation. If you choose the BASIC you can, of course, save the code produced after running the loader with SBYTES mdv1_flip.scode, base,140.

```
* Program to add extra Basic keywords for screen control
* Keywords are SAVE_SCR, SHOW_SCR, FLIP
* SAVE_SCR saves to RAM the current screen, replacing any previously saved screen
* SHOW_SCR displays the screen in RAM, destroying the current screen
* FLIP displays the screen in RAM but saves the current screen in its place,
* whence it can be restored by another FLIP

* QDOS codes
*
MT.ALCHP EQU $18           Allocates common heap space
BP.INIT EQU $110          Vectored utility to link into Basic
*
* Program constants
*
SCR_START EQU $20000      Base address of screen memory
LONG_WORDS EQU $2000     Number of long words in screen
SCR_BYTES EQU $8000       Number of bytes in screen
ME EQU -1                 Code to signify this job
*
* First allocate enough heap space for whole screen
*
MOVE.L %SCR_BYTES,D1      Number of bytes required
MOVEQ #ME,D2              for this job
MOVEQ #MT.ALCHP,D0
TRAP #1                   Do it
TST.L D0                  Any errors?(like out of memory)
BNE.S EXIT                Yes, so forget about it
LEA HEAP_START,A3         Otherwise save base address of heap
MOVE.L A0,(A3)            in A3 and HEAP_START
*
* Link in the extra Basic keywords
*
LEA PROC_DEF,A1           Point to table in standard QDOS format
MOVE.W BP,INIT,A2         Point to vectored utility
JSR (A2)                  and go to it
CLR.L D0                  Make a good return
EXIT RTS                  to Superbasic
*
* Set up the table as required by Qdos for the extra keywords
*
PROC_DEF DC.W 3           Number of Procedures
DC.W SAVE_SCR-*          Pointer to first
DC.B 8,'SAVE_SCR',0      and its name
DC.W SHOW_SCR-*          Pointer to second
DC.B 8,'SHOW_SCR',0     and name
DC.W FLIP-*              Pointer to third
DC.B 4,'FLIP',0          and name
DC.W 0                   End of procedures
DC.W 0                   No functions
DC.W 0                   End of table
*
* Define the action to be taken on calling keyword from Superbasic
*

SAVE_SCR BSR.S SET_UP      See SET_UP
FILL_HEAP MOVE.L (A2)+,(A1)+ Move a long word from screen to heap
DBF D1,FILL_HEAP and do it again for the whole screen
CLR.L D0 Make good
RTS return to Basic
*
SHOW_SCR BSR.S SET_UP
FILL_SCR MOVE.L (A1)+,(A2)+ Move a long word from heap to screen
DBF D1,FILL_SCR and carry on until finished
CLR.L D0
RTS
*
FLIP BSR.S SET_UP
CHANGE MOVE.L (A2),D3      Move a long word from screen to D3
MOVE.L (A1),(A2)+ and replace it with the first word on heap
MOVE.L D3,(A1)+ then move the original screen word to heap
DBF D1,D1,CHANGE and again until complete
CLR.L D0
RTS
*
*
SET_UP LEA HEAP_START,A3 Set A1 to base
MOVEA.L (A3),A1 address of heap
MOVEA.L %SCR_START,A2 Set A2 to base address of screen
MOVE.L #LONG_WORDS-1,D1 Set up D1 as a loop counter
RTS and back to caller
*
HEAP_START DS.W 2 Reserve space to store base address of heap
*
END
```


Quantum Leaps: The QL Case Study

Probably the most dramatic and useful application any computer can have is for the medical profession, where the need to find very specific pieces of information about patients quickly can literally be a matter of life and death.

In its small way, the QL has become an important method of storing such patient information at the Children's Hospital in Birmingham. Using the powerful QL Archive program included with the QL, the hospital has developed its own database to store and retrieve patient reports.

The hospital uses a standard QL running QL Archive, hooked to a monochrome monitor and a Brother M1009 printer. Patient records and diagnoses are stored on the QL by three secretaries putting information on to the system.

The QL is used in the hospital HistoPathology department and records, among other data, information on specimens removed from patients during operations. Dr Alan Brown-Hill explained that the field names for the database include such vital information as the patient's name, age, sex, hospital registration number, the laboratory number of the specimen and an abbreviated diagnostic summary using pre-defined codes. Three extra fields have been added to indicate whether there is any existing photography of the parts removed, microphotography of slides from the microscope or electron microscopy data.

The department has already stored its 1984 data, some 1,100 records, on a single Microdrive cartridge and is now planning to work through all such records for the last 25 years to compile a complete patient database. It is hoped that during the process some high-

capacity disk drives can be bought, although the Microdrives have presented no real storage problems so far.

Operators make two back-ups of all data entered into the database to ensure that precious information is not lost. Completed patient reports are entered into the system once or twice a week and each update takes only half an hour to an hour. The reports are also sorted and printed-out each week according to various criteria.

Although the hospital says the QL has not really reduced the work required to keep those patient records, it has made information much more readily available than the paper-based card index system it had been using previously.

SPECIAL OFFER OFFICE

The Special Offer Office keeps track of all deals and discounts for QLUB members, which includes anybody who is sent this newsletter. Listed below are the deals offered to members:

★ Metacomco is offering QLUB members price reductions on its development and programming software. The company will give you a 20 percent discount on selected software. For more details, write to:

Metacomco Offer,
Special Offer Office,
26 Portland Square,
Bristol BS2 8RZ.

★ GST Computer Systems is offering its acclaimed 68K/OS operating system for the QL at a 20 percent discount. For details, write to GST Computer Systems, 8 Green Street, Willingham, Cambridge CB4 5JA or telephone Jane Pateman on 0954-81991. Have your membership number and address to hand.

★ Westway software is offering its new machine-code arcade game, EVA, at a discount to QLUB members. The game sells for £10.95 but QLUB members can buy it for £1 off that price. Send your orders to QLUB Special Offer, Westway, 24 Preston Road, Lytham, Lancashire.

★ DRK Products Ltd is offering its Microdrive-tidying racks to QLUB members at a 20 percent discount off the normal £4.95 price. This simple rack can be affixed to your QL, just above the keyboard. To order, send your £3.95 (per rack) to DRK Products Ltd, Bar One, Pipers Lane, Cadlington Common, Near Markyate, Herts AL3 8QF or call on 0582-840402.

★ Duckworth Publishers offer a 20 percent discount on Adam Denning's new book, Advanced QL Machine Code. The retail price is £8.95 but QLUB members can obtain the book at £7.16. Contact Duckworth Publishers, Sales Department, The Old Piano Factory, 43 Gloucester Crescent, London NW1 or telephone 01-485-3484.

★ A 20 percent discount is available on selected items of QL software sold by Sinclair Research through QLUB.

QL Technical Guide, QLUB price £11.95.

QL Monitor, QLUB price £19.95.

QL Assembler, QLUB price £31.95.

QL Toolkit, QLUB price £19.95.

Send your order, using the form on page 12, to Sinclair Research, Stanhope Road, Camberley, Surrey GU15 3PS.

★ A discount is available for a year's subscription to EMAP's *QL User* magazine. A year's subscription including delivery normally would cost £15. If you subscribe through QLUB, the magazine will be delivered for an all-in (postage included) price of £11.50. To receive your 12 issues, send a cheque or money order for £11.50 to PRQL, Subscription Department, QL User, Priory Court, 30/32 Farringdon Lane, London EC1.

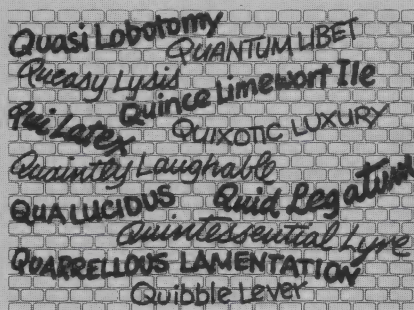
QL Quarks

Ah, the difficulties of writing cerebral humour about the QL. This writer's imagination is stretched to the limit and I am now pleading for readers' contributions. Since the response to our last limerick competition was overwhelming, the QLUB editor feels that we do not want to be accused of stemming our readers' creativity. The fact that we may be on to a good thing may also have a slight bearing on the situation.

We are looking for the best completed answer to the following limerick:

A QL on a day trip to London

There is even remuneration in the offing; the three best completions of this limerick will receive a free copy of QL Cavern. Send your priceless prose to the QLUB Editor and watch this space to see if you are Poet Laureate material.



QL demo delights

Imagine the scene; it is a dark and stormy night, you wander down the high street in search of shelter and see a QL retailer, who invites you in. Protected from the cold, you sit in front of a demonstration QL to exercise your cold and numb fingers. Seeing there are no Microdrive cartridges plugged in, you try to "break" the demo program.

Pressing various keys only makes the demo program run faster. Nothing seems to stop the mysterious ghost in the machine.

Fear not, it is all part of a new campaign to show off QL software. Dealers up and down the country have been issued with special demo QL ROMs to put inside their display machines which cause the machines to run demonstrations of QL software continually. The ROMs are hidden so that they cannot be removed or tampered with, unless there's a real ghost in the machine.

QLUB product order form

To order DIRECT FROM SINCLAIR RESEARCH Ltd
Complete the coupon below

Product Code	Title	Quantity	Price	Total
6509	QL Technical Guide		£11.95*	
5501	QL Assembler		£31.95*	
5502	QL ToolKit		£19.95*	
5509	QL Monitor		£19.95*	
5500	QL Chess		£19.95	
5514	QL Cavern		£12.95	
5515	QL Gardener		£24.95	
5504	QL Touch 'n' Go		£24.95	
5508	QL Integrated Accounts		£89.95	
5503	QL Cash Trader		£69.95	
5513	QL Home Finance		£24.95	
5505	QL Project Planner		£39.95	
5506	QL Decision Maker		£39.95	
5507	QL Entrepreneur		£39.95	
			TOTAL	

* Indicates QLUB special 20% Discount price

● Please tick if you require a VAT receipt ☐

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Signature _____ PLEASE PRINT

Name: Mr/Mrs/Miss/Ms _____

Address _____

QLB007

Send to Sinclair Research, FREEPOST, Camberley, Surrey GU15 3BR

LANGUAGES FOR THE SINCLAIR QL



METACOMCO

ASSEMBLER

Use ASSEMBLER for its speed, compact code, and for complete access to the QL's many features. Write programs and routines in assembler and call them from SuperBasic, or link them into programs written in high level languages.

- > **Standard Motorola 68000 mnemonics** The full Motorola instruction set is supported.
- > **Precise error messages** Over 160 explicit error messages are used. Error lines are either flagged in a listing or written to the console. A precise description of what is wrong with the line is given.
- > **External references** These allow assembly language modules produced by the assembler to be linked with other program segments written in assembler or in a high level language such as BCPL.
- > **Integral linker** Linker allows up to twenty assembler programs to be linked together.

- > **Absolute, position independent and relocatable code** The assembler can produce absolute code; alternatively it will automatically use program counter relative addressing to ensure code is position independent. For code requiring relocation a relocatable object file is produced which allows a program to be run in the memory location into which it has been loaded.
- > **Macro expansion** The assembler provides full macro expansion directives, compatible with the Motorola specification. Commonly used sequences of instructions, such as making QDOS requests, can be packaged up into macros.
- > **Conditional assembly** Conditional assembly directives such as IFEQ allow optional inclusion of sections of program text.
- > **Large range of directives** Nearly thirty assembler directives are provided which specify symbol and data

THE METACOMCO DEVELOPERS
Metacomco offers you a choice of languages for programming the QL: Assembler, Basic, Pascal, and C. Each package is provided as a 'Development Kit' containing the language software, together with

definitions, and handle a wide range of assembly commands.

- > **30 character variable names and 32 bit expressions** Long variable names allow symbols to be given sensible names rather than unintelligible contractions. All arithmetic uses 32 bit values. A wide range of expressions can be specified at any point where a simple constant label is required.
 - > **Fully formatted listings** The listing output from the assembler shows the instruction line, the code produced and the relative offset or absolute address. Listings are page formatted, and listing directives are available to alter the page size, provide page throws, blank lines and so on.
- With the screen editor and user manual.**

BCPL

Use BCPL for systems programming - writing utilities, games, and applications packages. BCPL is now widely established as the systems language for many computers; the QL version has special built-in routines to interface you directly to QDOS features such as window-handling, graphics, and file handling. BCPL offers the convenience of a high level language combined with the flexibility of an assembler.

- > **True compiler** The product is a true compiler, generating native 68008 code. Programs are compact and fast.

- > **Concurrent programming** The resulting programs are linked with the runtime library to produce a directly EXECable command, enabling the full multi-tasking power of the QL to be obtained. Multiple BCPL programs can thus be run concurrently.
- > **Standard BCPL** The BCPL includes a full runtime library containing all the standard BCPL functions.
- > **Special QL interfaces** Special routines are provided for interfacing with QDOS features. These make it simple to program windows, graphics, cursor control and a wide range of file operations using BCPL.
- > **Exception handling** Exceptions

trapped by QDOS are handled by the BCPL runtime system, which gives suitable diagnostics to aid in debugging.

- > **Separate compilation** The module link-loader allows program segments to be separately compiled and linked together before they are run. Alternatively the link-loader can be used to run a BCPL program immediately, enabling quick and easy program development.
 - > **Compatible with assembler** Modules can be written using the Metacomco Assembler and linked in with BCPL modules where required.
 - > **32 bit variables** All BCPL cells are 32 bits long, enabling the full address space of the QL to be used. Floating point operations are implemented using vectors of 6 bytes.
- With screen editor and user manual.**

LISP

Use LISP for developing symbolic programs and for manipulating data structures. LISP is one of the significant computer languages of the 1980's, widely used for research into expert systems and artificial intelligence.

This QL version is ideal for learning about the language or for experimenting with expert systems. Explore the world of artificial intelligence using LISP on your QL!

- > **Full support of QL features** All the special features of QDOS such as windows, graphics, and screen handling are supported.
- > **Compatible with Acornsoft LISP** LISP is compatible with the popular Acornsoft LISP for the BBC microcomputer. It has many additional features such as 28 bit numbers, larger work space, and extra functions.
- > **Interpreter** LISP is an interpreter, like most Basics. This is particularly useful in

program development and debugging, since changes can be rapidly tested.

- > **Turtle graphics** LISP includes a set of turtle graphics commands, such as MOVE, DRAW, TURN, INK, and FILL. These provide easy access to the QL's graphics capabilities.
 - > **Structure editor** A special editor is built in for altering LISP programs and data structures.
 - > **Prettyprinter** A prettyprinter is provided to help you read and understand LISP programs, by displaying them in a suitably structured format.
 - > **Tracer** The tracer is used during debugging to indicate the flow of control.
 - > **Garbage collector** Memory space handling is completely automatic - a garbage collector is called when required to recover any unused space.
 - > **28-bit integers and 250-character names** Large integers and long identifiers make LISP a powerful and versatile language.
- With the screen editor and user manual.**

THE SCREEN EDITOR

Every Development

Kit includes this versatile screen editor:

- > **Full screen editor within user defined window** Multiple versions of the editor may be running at any one time, using different windows on the screen.
- > **Edits any ASCII file** The editor can be used on any standard ASCII file. This includes data files and program sources.
- > **Horizontal and vertical scrolling** Text is displayed within the window and can be scrolled horizontally or vertically as required.
- > **File merging** One file can be inserted at any point into another, allowing files to be merged. A block of text can also be written out to a named file allowing selective inclusion of one text

DEVELOPMENT KITS FOR THE QL

Five powerful software packages: assembler, BCPL, LISP, Pascal, and C. Development Kit' which includes the screen editor, and a user manual.

QLC

QLC is a powerful compiler originally developed by LATTICE for 8086/88 microcomputer systems and now adapted for 68000 environments. In this implementation for the QL, the compiler accepts source code files written in the C programming language and produces relocatable machine code in Sinclair object module format, which is linked into larger programs using the linker. The QLC library defines a comprehensive set of useful subroutines and implements most of the Unix I/O functions under QDOS. The original C programming language was developed at Bell Laboratories as an alternative to assembly language under the Unix operating system for minicomputers. QLC implements the C language for the QDOS operating system, following C features and functions as described in the definitive Kernighan and Ritchie text, *The C Programming Language*. C is a powerful, elegant and increasingly popular programming language suitable for a wide variety of applications where speed and clear structure are crucial.

- > Full Kernighan and Ritchie implementation
- > Powerful data types (pointers, arrays, structures, unions)
- > Separate compilation
- > Conditional compilation

Note for commercial developers: The QL Pascal and QL C Development Kits both include a ROM cartridge. This cartridge is only used when compiling programs, and is not required at runtime. No runtime licences are required by developers wishing to distribute copies of programs developed using the Metacomco Development Kits.

segment in another.

- > **Block copy and delete** A block of text can be defined which can then be copied elsewhere or deleted.
- > **Find and Replace** A full range of search and exchange commands are provided such as Find, Backwards Find, Exchange, and Query.
- > **Arbitrary repetition of command groups** Commands can be combined into command groups, and any group repeated a specific number of times. Command groups can be nested and thus complex command lines built up to make global changes to a file.
- > **Automatic word wrap** The editor supports automatic word wrap at a user defined right margin; the left margin can also be altered.

- > Macros
- > LATTICE design
- > Linker
- > True native code compiler
- > Comprehensive error handling
- > Large library of Unix

and utility functions

- > Full floating point arithmetic
- > No runtime licences required
- > Easy to use QDOS interfaces
- > Approved by Sinclair Research

All C language features are supported including:

PRE-PROCESSOR COMMANDS: #include, #define, #undef, #if, #ifdef, #ifndef, #else, #endif, #line. STORAGE CLASSES: extern, static, auto, register, typedef. TYPE DECLARATORS: int, char, short, unsigned, long, float, double, struct, union. OBJECT MODIFIERS: *, [], (). Declarations may be arbitrarily complex. INITIALIZERS: Full range of expressions accepted. SCOPE RULES: Identifiers may be redeclared at beginning of any block, but all "extern" objects must be declared consistently within same module. STATEMENT TYPES: All are supported, including labels and goto. OPERATORS: All are supported, in the standard precedence, including conditional and comma operators.

Data formats

TYPE	LENGTH	RANGE
CHAR	8 bits	0 to 255 (ASCII character set)
INT	32 bits	-2×10^9 to 2×10^9
SHORT	16 bits	-32768 to 32767
LONG	32 bits	-2×10^9 to 2×10^9
FLOAT	32 bits	$\pm 10^{-37}$ to $\pm 10^{38}$
DOUBLE	64 bits	$\pm 10^{-307}$ to $\pm 10^{308}$

Other features: COMMENT NESTING: comments may be nested in QL C. DOLLAR SIGN: may be used as embedded character identifiers. SYMBOL LENGTH: identifiers may optionally be up to 39 characters in length. STRING CONSTANTS: compiler generates only one copy of identically written strings. CHARACTER CONSTANTS: more than one character may appear enclosed in single quotes. STRUCTURE/UNION MEMBERS: separate lists of names are kept for each structure or union. POINTER CONVERSIONS: warning message is generated when incompatible value assigned to a pointer. STRUCTURE AS ARGUMENT: warning message is generated when struct or union used as function argument without preceding &. ADDRESS OF ARRAY: & can be used on array name to get pointer to array. **With the screen editor and user manual**

QL PASCAL

Pascal is a popular, general purpose computer language widely used for systems and applications programming. QL Pascal is a high specification implementation of this important language, designed to meet the exacting requirements of ISO 7185 - the international standard for Pascal - and to take full advantage of the power of the QL.

The compiler is fast and single pass. It produces native 68000 code: compiled programs are compact and efficient, easy to link with assembler, and do not require special runtime environments. QL Pascal makes it easy to use the QL's many special features, providing straightforward interfaces to the QDOS windows, graphics, traps, filehandling etc.

- > True native code compiler
- > Fast, single pass compilation
- > Fully conforms to ISO 7185
- > Any length variable names
- > Full QL address space
- > Very large sets and arrays
- > Comprehensive error handling
- > No runtime licences required
- > Easy to use QDOS interfaces
- > Approved by Sinclair Research

True compiler generating native 68000 code Applications written using QL Pascal will be fast and efficient; runtime systems are simple to implement. Many other compilers produce an intermediate code requiring a special runtime environment.

Object code can be linked to modules written in Metacomco's assembler or BCPL.

Fast, single pass compilation

QL Pascal generates object code in a single pass. Compilation is straightforward and fast: ideal in education or for program development.

Complete implementation of ISO 7185

QL Pascal fully conforms to ISO 7185 (level 0), the international standard for Pascal. This ensures full compatibility with other computer systems running ISO Pascal; programs written in QL Pascal can be readily transferred to other such computers. (Note ISO 7185 is the same as BS 6192 in the UK, and ANSI/IEEE 770X3.97 in the USA.)

Full QL address space QL Pascal can directly address all the memory space available on the QL.

Any length variable names and 32 bit integers QL Pascal takes full advantage of the power provided by the 68000 architecture.

Very large sets and arrays Very large sets and arrays can be handled, limited only by the size of QL memory.

Comprehensive error handling QL Pascal gives detailed error information, both at compilation and program runtime. The compiler recognises over 150 different errors, and the runtime system provides over 30 different English error messages.

Easy to use QDOS interface QL Pascal provides straightforward access to all the QDOS features: windows, graphics, screen handling, file operations, traps etc. **With the screen editor and user manual**

Comprehensive Range

Metacomco offers the most comprehensive range of programming languages available for the QL, including two that are recommended by Sinclair Research-QL Pascal and QL C. Thousands of copies of the

Professional Quality

Metacomco's QL products have been written by professional programmers, for professionals to use. All software is carefully designed and rigorously tested, resulting in powerful, reliable tools for the serious software

The right way to learn a new language

Metacomco's QL languages are ideal for programmers wishing to learn a new language. All the Development Kits are designed to meet widely accepted standards, ensuring that you learn a popular and accurate version. The Kits feature excellent error handling, in many cases

Metacomco Development Kits are now in use worldwide, establishing Metacomco as market leaders in supplying systems software for the QL. Use one of Metacomco's languages to write the programs for your QL!

developer. Metacomco has substantial experience in systems software and the QL; users of Metacomco's Development Kits are assured of excellent and continuing support. Metacomco: professional quality software, written by professionals!

providing precise explanations of mistakes. The manuals are thorough and helpful, and suggest suitable background reading to support both beginners and the more experienced. The Metacomco Development Kits: a good way to learn programming.

Ready to use development systems

All the Metacomco languages are supplied as complete Development Kits, ready for you to start programming. Each Kit includes

All Kits run on standard QL's

All the Metacomco Kits will run on a standard QL without the need for extra peripherals. The Kits also support memory

Widely available

The Metacomco Development Kits are available from many stores that stock computer software including HMV, John Lewis,

the software (language, screen editor, and linker - if appropriate) on micro-drive cartridges, and a user manual, packaged in a handy library case.

expansion, floppy disks, and other QL peripherals, making them ideal for professional development work.

W H Smith, Dixons and Menzies. Alternatively, they can be obtained directly from Metacomco - simply phone, or send the coupon below.

To: Metacomco, 26 Portland Square, BRISTOL BS2 8RZ, United Kingdom.

Please send me (TICK BOX):

QL C
Development Kit ☐ £99.95

QL PASCAL
Development Kit ☐ £89.95

Prices include VAT and postage in UK. Overseas orders please add £2 for airmail.

I enclose a cheque for £_____ or
please debit my ACCESS/VISA account

NAME: _____

ADDRESS: _____

POST CODE: _____

ASSEMBLER
Development kit ☐ £39.95

BCPL
Development Kit ☐ £59.95

LISP
Development Kit ☐ £59.95

CARD EXPIRY DATE: _____

SIGNATURE: _____

TEL NUMBER: _____

Metacomco specialises in systems software for computers based on the Motorola 68000 micro-processor family. It has been closely involved with the QL since early 1984, launching this language range later that year. Since then Metacomco's products for the QL have been widely reviewed in the computer press, receiving very favourable comment from reviewers and end users alike. Metacomco has also developed systems software products for the Commodore Amiga and the Atari ST micro-computers.

METACOMCO

26 Portland Square, Bristol BS2 8RZ, U.K.
Tel: Bristol (0272) 428781

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